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Supply of Oil.

The necessity for inventors applying their genius and skill to improved means of obtaining light and heat is constantly becoming more and more urgent. The whale oils, which have hitherto been much relied on in this country to furnish light, are yearly becoming more scarce, and may, in time, almost entirely fail, while the rapid increase of machinery demands a large portion of the purest of these oils for lubricating. Hence, good inventions, in any way connected with these two great subjects, can hardly fail to reward the inventor. Any means of cheapening the materials, or of economizing their use, the introduction of new materials, or of new sources of light and heat, improved modes of using, by which better effects may be gained, would all be desirable. In the case of consuming fuel, the volatile parts, (which, of most combustibles, are large and valuable portions,) by the stoves, furnaces, and fire places now in use, mostly pass off unconsumed. A simple and effective invention, which would preserve and utilize all the constituents of fuel, would be of immense value. Inventors cannot do better than to direct their investigations into these channels.—*Philadelphia Ledger.*

[Pennsylvania will no doubt yet supply our markets with large quantities of coal oil from the rich cannel coal beds of her Western counties. We have seen some specimens of this coal, and can speak understandingly of its excellent oil-producing qualities. Within the past year, the price of sperm oil has fallen about 25 per cent. from the increased supplies of oil obtained from rosin and coal, and which have taken the place of sperm for many purposes, not because they are better, but cheaper.

The Morris Canal.

The business of this canal, in New Jersey, appears to be in a prosperous condition, according to the annual report of its officers, just published. The receipts for last year were $313,026·15, being an increase of $34,388 upon the income of the previous year. The company is providing an additional depot at Jersey City by reclaiming a portion of the submerged lands, where a pier 400 feet long will soon be completed, and will furnish additional facilities for the deposit and reshipment of coal. From this report, we learn, that nearly all the anthracite coal mined in Pennsylvania is sent eastward to tide water. In 1856 the total anthracite coal trade amounted to 6,751,542 tuns, of which only 906,293 were sent westward. The increase was 199,241 tuns over the product of 1855.

Another Mammoth Cave.

We were heretofore content with possessing the largest lakes, the highest water fall, and the largest cave in the world. Hereafter, however, we can boast of two mammoth caves, as a new one, it is stated, has recently been discovered in Marion county, Missouri, rivaling the old Mammoth in Kentucky. One gallery of it has been traversed for two miles, and contains deposits of saltpeter.

HOLMES'S ANCHOR TRIPPER.

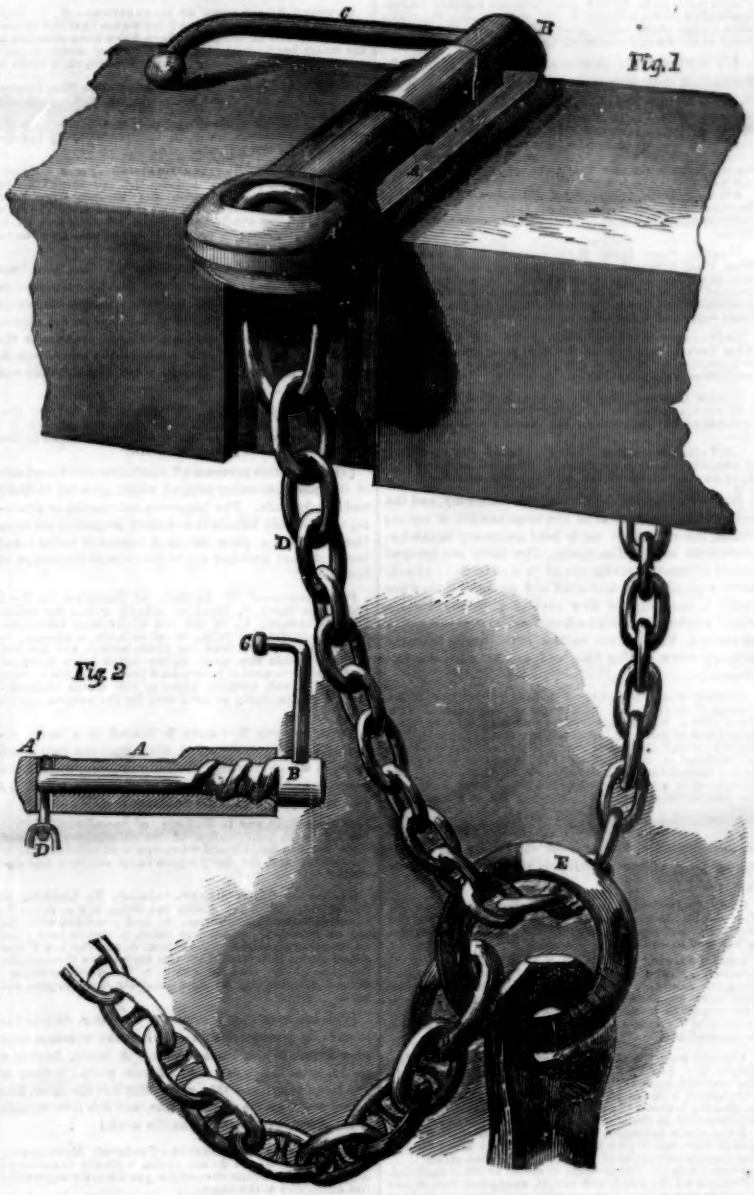


Fig. 1

Fig. 2

The accompanying engraving represents a simple device patented by Mr. John B. Holmes, of this city, on the 28th of April last, for the easy, rapid and safe release of an anchor when it is desired to let it fall. It is shown in perspective by Fig. 1, and in longitudinal section on a smaller scale by Fig. 2.

The anchor is suspended by a suitable short chain, D, passed through the ring, E. The last link of this chain is larger than the others, and fits over a bolt B, which supports it. This bolt has a large and stout thread, fitted, (as represented in Fig. 2,) within a corresponding female screw in the housing A. C is a handle or lever by which B may be turned a half revolution, which is sufficient to disengage its rounded end from the chain and thus to let go the anchor. The gravity of C is sufficient to prevent the possible turning of B without assistance, and the great pitch of the screw, or the coarseness of its threads enables a half revolution to accomplish all that is necessary in withdrawing it. The cavity in the overhanging portion, A', is sufficient to allow the chain to be inserted freely, but without much play; and as the bolt B is withdrawn by its half revolution, the link is released altogether, without possible difficulty or danger. The end thrust of the link on B, as its slips off from its rounded end, is very well provided for by the stout threads of its screwed portion, and any possible violent action on the hand of the operator is prevented by the friction of the screw, which, although made with a quite coarse pitch, does not allow the force to act with sufficient advantage to turn B spontaneously, and consequently the hand controls it with perfect ease in its most violent effort. This is an admirable principle, and is applied in many other varieties of mechanism.

There are many instances in which the dropping of anchors from vessels in great danger has been considerably delayed from the want of some adequate means of releasing the heavy mass immediately, and with due safety to the operators. This device seems to overcome the difficulty quite perfectly. If necessary to prevent annoyance from careless, meddlesome, or malicious individuals, the lever C may be secured down by a lock, or other suitable means; but it is not assumed to be necessary, and the freedom with which it can be operated immediately, if not thus encumbered, adds much to its value.

Further information may be obtained by addressing J. R. Pratt, assignee of the inventor, No. 67 South street.

The Albany *Journal* advocates the employment of fire engines in quelling riots, in preference to the use of balls and bayonets. This plan, if followed, would certainly "throw cold water" upon the rage of a mob, and might dampen their ardor, if not wet their powder.

To Restore Writing.—To Dye Straws.

Many documents that have been written with bad ink after a certain time fade, especially if they have been kept in a damp place, or if the paper has been over-bleached in its manufacture. Sometimes ship letters get wetted with sea water, and many other causes obliterate writing that is of much value. In nearly all instances such writing may be restored, or at least rendered legible, by brushing over the half distinct lines with a solution of prussiate of potassa with a camel's hair pencil. The solution may be made by dissolving about half a teaspoonful of prussiate potassa in a tablespoonful of boiling water. For certain chemical reasons this does not answer in all cases, and when it fails we may use the following with good hopes of success: First a strong infusion of tea, made with a teaspoonful of black tea in half a cup of boiling water; or, secondly, a solution of carbonate of soda made in the same manner; or thirdly, a quarter of an ounce of protosulphate of iron (green vitriol) in a like quantity of water. A last resource is a solution of sulphuret of potassium (liver of potash) of about the same strength as the preceding solutions. In trying to restore writing, we ought to begin with only one or two words, because if the first solution does not answer, we then have an opportunity of trying the others successively, until we discover which answers best; but, as a general rule, it may be relied on that the first named is the most likely. These trials are equally adapted for writing upon parchment as upon any other material.

All the varieties of straw are coated on their surface with a material resembling glass, a hard impenetrable substance, and which is very visible on common cane; on this account it is with difficulty that the dyer can impart any great variety of color; this is seen in the straw hat trade. Were it not for this difficulty it is more than probable that straw bonnets would be seen in all the colors of the rainbow. Although the colors are by no means bright, yet it is possible to stain straw sufficiently for many ornamental purposes. Many of the grasses are so exceedingly beautiful in form that they are frequently gathered, and, when dry, are made up into pretty ornaments for the sitting-room. If, however, some of the specimens are not artificially colored when grouped together, they have rather a sombre appearance, owing to their sameness of tint. A little variety of color may be imparted thus:—

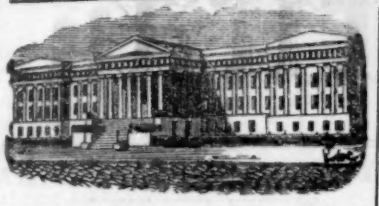
Blue is given by dipping the straw into a boiling hot solution of indigo in sulphuric acid. A light blue can be given by diluting with water the above solution to the desired shade. Yellow is imparted by steeping the straw in a boiling decoction of tumeric and alum. Green is imparted by dyeing the straw first blue and then yellow. Black and slate colors are produced by first dipping the straw in a decoction of log wood, and afterwards in a solution of sulphate of iron. Other tints are procured by varying the bath with prussiate of potash, chromate of potash, Brazil wood, archil, and many other chemicals.

SEPTIMUS PIESSE.

Increase of Tourists.

It is said that previous to the year 1850, the number of Americans who indulged in a tour to Europe never exceeded 7500 in any one year. Now the number of those who cross the water for an airing, annually, has swelled to 35,000.

A huge steam engine of 1,700 horse power has been put up at the iron works in Scranton, Pa. It is stated to be the most powerful and beautiful stationary steam engine in the United States.



[Reported officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING JUNE 16, 1857.

MOLD BOARD FOR REVERSIBLE PLOWS—Henry S. Akins, of Berkshire, N. Y.: I do not make an unqualified claim to the mold board composed of rods, for that has been known and used before in plows to turn furrows one way.

Neither do I claim turning the share and mold board of a plow to both sides of the land side, as that is a well known operation.

I claim providing a reversible plow with a mold board susceptible of torsion, or of being twisted to the right and left by means of being composed of a series of rods or bars of any desired number, so constructed and arranged with the other parts of the plow that they can be placed and held alternately in the different positions and directions required for turning alternate right and left furrows.

BRINE EVAPORATORS—Chas. W. Atkeson, of Henderson, Ky.: I am aware that a series of horizontal tubes has been combined with the flue of a vertical cylindrical steam boiler, and therefore I do not claim said arrangement.

But I claim combining a series of horizontal heating tubes with a vertical flue or chimney, when said flue or chimney is combined with an inclosing vertical casing, which has an enlargement at its upper end, entirely above the uppermost of the said heating tubes, substantially as set forth.

CARD PRINTING PRESSES—Franklin L. Bailey, of Boston, Mass.: I do not claim the combination of feeding guides with the bed against which the card is to be pressed.

But I claim applying the guides, I I, to the bed, substantially as described, that is, so that they may spring or move away from and towards it, and thus not only relieve the card from contact with and friction against the surface of the bed, while such card is descending in the guides, but also to operate the knife and allow it to move backward, substantially as specified.

I also claim arranging the guides, I I, so as to incline back from the vertical plane, the same being for the purpose of supporting the card and enabling the guides to be used without any front lip, as described.

I also claim the combination of the spring card holder, M, with the card rest or stop, K, and the feeding guides or mechanism, and the bed and platen, the said card holder being applied to the stop, K, so as to operate substantially in the manner and for the purposes set forth.

I also claim applying the feed and pressure rollers in a rocker frame combined with the vibrating frame, F, and provided with adjustments, arranged so as to enable the rocker frame to be tipped a little as occasion may require, to cause the continuous sheet of paper or cardboard to operate properly with respect to the position of the form on the platen.

I also claim arranging on the shaft, B, and so as to operate with the stationary roller, as described, and with the feeding roller, a spring pressure roller, U, to act against the edge of the sheet of card, so as to maintain its opposite edge in a proper position with respect to the type.

LATHS FOR BUILDINGS—John L. Brabyn, of New York City: I claim the forming of the interstices in the form of a dovetail, or its equivalent, and the back support for the mortar in the laths themselves, and entirely independent of anything that may be placed behind them, by grooving one or both edges of the lath on one side, and leaving the other side the full width, so that when the same are in place their edges shall join at the back side, to prevent the plastering material from pressing through between the laths, the grooves forming the clinches to hold the mortar firmly in place, substantially as set forth.

SAFETY ATTACHMENT FOR HATCHWAYS—James Bridge, of Augusta, Me.: I claim the guards or fenders, C, attached to the arbors, D, which are secured to the underside of the doors, B, and connected with the flooring by the chains, b, the above parts being used in connection with the inclined flanches, f, and springs, E, substantially as described for the purpose set forth.

[By this improvement when hatch doors are raised, fenders are thrown automatically in proper position to prevent persons from accidentally falling down the hatchway. Such an invention is much needed in this and other cities, where so many persons have lost their lives by falling down unguarded openings.]

HYDRANT—Joel Bryant, of Brooklyn, N. Y.: I do not claim anti-freezing hydrants or water pipes.

But I claim hydrants and water pipes with two main cylinders, A and B, and a cylindrical bottom part, F, with openings, g g, in cylinder, B, and openings, e e and d d, in the bottom part, F, operating in connection with each other for the admission and discharge of water, substantially as described and for the purpose set forth.

STOCK FOR BENCH PLANES—Joel Bryant, of Brooklyn, N. Y.: I claim the construction of bench planes having an opening with a backward inclination made by the dispensing with or the removal of the lower edge or lip of the plane stock (as existing in bench planes of ordinary construction) the said opening being made for the purpose of avoiding the annoyance produced by splinters or small pieces of wood fastening into the recess as formed by the said lower edge or lip of the plane stock and the bevel of the plane iron in common bench planes, substantially as described for the purpose set forth.

SPLITTING LEATHER—Dexter H. Chamberlain, of West Roxbury, Mass.: I claim the described rigid and beveled hoop knife for splitting leather, operating in the manner substantially as set forth.

HARVESTERS—Nicholas Clute, of Dunnsville, N. Y.: I claim the racking apparatus described, consisting of the endless belt, I I, carrying arms or rakes, K K, when used in combination with the endless clearing apron, L, curved and elevated platform, K', all arranged to operate in the manner and for the purposes set forth.

CORN MACHINE—Edward Conroy, of South Boston, Mass.: I do not claim the employment or use of expanding cutters for cutting corks, bungs, etc., irrespective of the arrangement shown, for expanding cutters, have been previously used, although differently arranged from the plan shown.

But I claim the expanding cutters attached to the rods or bars, F, and operated by the plate, R, attached to the rod, N, the rods, F, having pins, g, passing through their upper ends, which pins are allowed to slide laterally in their recesses, h, as the rods are actuated by the plate, R, the above parts being arranged substantially as described for the purpose set forth.

I further claim, in combination with the cutters, f, arranged and operated as shown, the cams, K, and bed, L, for feeding the stuff to the cutters.

[The expanding cutters in this machine are operated in a simple manner by the stuff as it is fed in, so that they gradually expand in the course of operation, and cut out bungs and corks of a tapering or conical form, rapidly and with facility.]

ROLLER TEMPLE FOR LOOMS—Warren W. Dutcher, of Milford, Mass.: I claim the described improved roller temple case made with a cylindrical recess, for the reception and protection of one head or end of the toothed roller, in the manner as specified.

BUTTER WORKERS—Chas. W. Gage of Homer, N. Y.: I claim the combination of rollers, C C and C', within scrapers, E and E', connected and operating in the manner and for the purpose set forth and described.

MAKING AXE POLLS—Richard H. Cole, of St. Louis, Mo.: I claim first, Constructing a die box of three permanent and three movable sides, arranged and operating substantially as set forth.

Second, I also claim arranging the vertically acting cutter, e', and the projecting portions of the sections, p t, of the die box, or their equivalents, in such a manner in relation to the other parts of the machine that the said enumerated parts will operate substantially in the manner set forth.

Third, I also claim combining the oval punches, b e, with the opposite movable sections, c d, of the die box, when the said die box is furnished with a sharp edged side, p, which acts in conjunction with the said oval punches, in converting a rectangular shaped blank into a properly shaped axe poll, substantially as set forth.

Fourth, I also claim cutting a rectangular shaped solid blank from the end of a bar, and then driving said blank into a die box, and converting it into a properly shaped axe poll, substantially in the manner set forth.

INVALID BED ELEVATORS—D. Stringham Dunning, of New York City: I claim, the jointed bars, C C, connected by the cross pieces, D D, the cranes, B B, attached to the upright, A, the winches formed of the sliding pulleys, K K, and gear, G I, the ropes or chains, i, attached to the pulleys, k, and cross pieces, D, of the bars, C, the whole being combined and arranged substantially as shown and described for the purpose set forth.

[By this invention, perfectly helpless invalids may be raised from their beds with ease and facility, and if required, moved from place to place in an apartment.]

STEAM PRESSURE GAUGE—Joseph L. Eastman, of Boston, Mass.: I do not claim the elastic diaphragm, nor the disk bearing thereon, nor the multiplying lever bearing upon the disk, nor the compensating spring acting upon the lever, nor the mechanism which actuates the index.

But I claim the arrangement of diaphragm, I, disk, M, bearing against the diaphragm, multiplying lever, C, compensating spring, R, and index, substantially as set forth.

MAKING CAST IRON MALLEABLE—A. K. Eaton, of New York City: I claim the employment of oxyd of zinc in the production of malleable iron castings, in the manner specified, so that the articles, whilst under this treatment, will have continually presented to them, a fresh supply of decarbonizing material.

DEPILATING COMPOUND FOR HIDES—A. K. Eaton, of New York City: I claim the depliating process described, consisting in the employment of the ingredients mentioned, in the manner set forth.

SCREW CUTTER—Jas. M. Evarts, of Westville, Conn.: I do not claim the chuck for adjusting the dies nearer to or further from each other, for that is a well known device.

But I claim the rotary dies, C, placed within sliding or adjustable plates or sockets, B, attached to the chuck, A, or an equivalent device, for the purpose set forth.

[Instead of having the cutting dies stationary, and the rod to be cut rotating, as in the usual method of cutting screws, the rod to be cut is held stationary in this improvement, and the dies rotate. The latter are secured within adjustable sockets placed in a concentric chuck, and are peculiarly constructed and arranged; they are really a succession of slow revolving cutting wheels, which continually bring fresh cutting surfaces into action on the rod. The cutters endure much longer than the ordinary screw cutting dies, and are an excellent improvement.]

MOTION FOR PRESERVING ROLLING CONTACT, &c.—George P. Gordon and Frederick O Degener, of New York City: We claim supporting or hanging a reciprocating bed or plate, B, upon supports, C C, placed obliquely, or out of parallel with each other, substantially as described, so that the face of such bed or plate shall, as it is moved back and forth, work in contact with the periphery of a cylinder, or with a fixed point or line, or act intermittently against a swinging bed or plate, as set forth.

[This invention is especially adapted to type and lithographic presses, also to those for die sinking, for obviating the great amount of friction attendant upon their operation]

CORN PLANTERS—Ives W. McGaffey, of Buffalo, N. Y.: While not claiming a swinging frame carrying the seed boxes and plows, and by which the plows are raised or lowered as described.

I claim hanging said swinging frame, E, by boxes, F, upon fixed sleeve boxes, G, arranged around, but distinct from, the axle, C, to insure freedom of the axle against resistance encountered by the plows, without, in the swinging of the frame, E, varying the relative concentric position of the axle and seed distributing devices thereon to the seed boxes.

CHAIRS FOR INVALIDS—James G. Holmes, of Charleston, S. C.: I claim the arranging of the joint by which the seat and back are attached and move, so that it shall correspond with the hip joint of the human frame, that is, placing it above the seat, and in advance of the back, substantially in the manner and for the purpose set forth.

I also claim arranging the knee joint in the chair or seat to correspond with that of the human knee joint of the person occupying it, substantially as described.

I also claim the frame-work of metal or other material, by which all the joints and pivots, excepting that of the separate apron which moves with and supports the leg from the knee down, are combined either with or without the arm rest, as may be desired, as set forth.

SEED PLANTERS—Solomon T. Holly, of Rockford, Ill.: I claim the employment or use of the indicator, b', connected with the valve, U, arranged and operated as shown for the purpose set forth.

[The indicator of this seed planter shown, when its outer end is depressed, that the valve is open, and the seed permitted to drop. Its object is to insure the dropping of the seed at the precise places, and the attendant, by a lever, can control the depositing of it—a very necessary arrangement to insure correct planting.]

BEDSTEADS—Peter Hinds, of Kendall's Mills, Me.: I claim a turn up bedstead, constructed substantially as described, with two sets of sockets in its feet posts, and with movable or secondary posts, provided with connecting levers or bands, by which, when the bed is turned up into a vertical position, the bedding may be maintained in place, as specified.

ANIMAL TRAPS—Henry Hackman, Jr., of Pequa, Pa.: I am aware that tilting platforms are used for catching animals, and various kinds of levers, springs and weights are attached to operate such platforms. Those I do not claim.

I claim the combination of the self-acting spring board, G, with the platform, B, horizontal spring, I, and lever, M, constructed, arranged and operating substantially as described, for the purpose of assisting in throwing off the animal as the platform tilts.

SEWING MACHINES—Daniel Harris, of Boston, Mass.: I am aware that a looper or hook has been before made and used for effecting the same purpose as my looper—namely to take the loop from the side of the needle and lay it open under the point thereof—by having reciprocating horizontal and rotary movements imparted to it. I therefore do not claim these peculiar movements of a looper.

Neither do I claim moving a hooked needle vertically through a fixed bearing up through a feed bar, to take the thread from the cloth, as my looping apparatus is not for such purpose.

I claim the arrangement of the mechanism described for operating the reciprocating looper, and giving its rotation or partial rotation, for the purposes set forth; that is to say—

I claim the combination of the inclined slot plate, m, the pin, n, and the stud, q, or their equivalents, they operating as above described to produce the proper movements of the looper.

RUDDERS—Robert S. Harris, of Galena, Ill.: I claim the application of an outer or second rudder attached to and working on the common rudder.

I also claim the short tiller held and worked by stationary chains or ropes, as above described, for the purpose named.

SAFETY POCKETS—Horace Harris, of Newark, N. J.: I am aware that Joseph Cotton has a patent for spring bolt and catch for fastening plates connected with pockets I do not use or claim any of his devices.

I claim the wire frame, with the spring, C, for throwing it open, constructed in the manner described.

GAS GENERATORS—Augustus A. Hayes, of Boston, Mass.: I claim my improved gas retort, substantially as described and represented, that is, with only one chamber and with a compression conduit, arranged wholly or partially outside of the chamber of the retort, and so as to pass directly into the stand pipe, and have an entrance or opening into its front end, to be closed either by the door of the retort or by a separate small door, or its equivalent, as circumstances may require.

I also claim combining with the gas retort and its compression conduit, a means substantially as described, for diminishing the internal area of the passage of the gas through the conduit, in order to produce the amount of compression of the vapors in the chamber which may be required, according to the kind of coal or other material used, the retort by such means being adapted to the decomposition, in the manner set forth, of any bituminous coal or other gas-producing material.

CUTTING APPARATUS OF HARVESTERS—M. G. Hubbard, of Penn Yan, N. Y.: I am aware that the cutters of reaping and mowing machines have been attached to the cutter bar by means of a single bolt or screw to each cutter, and consequently I do not claim such mode of fastening.

Neither do I claim the device patented to Wm. Hovey, April 29, 1856, and from which my invention radically differs.

But I claim the mode of attaching the cutters, c, to the cutter bar, r, substantially in the manner, by the devices, and for the purposes set forth.

SCOURING AND SETTING LEATHER—Peter E. Hummel, of Pulaski, N. Y.: I claim the revolving table or bed, H, in connection with the reciprocating head formed of the frames, a, attached, in which the shafts, d d, are fitted, the shafts being provided with socke s, k, and adjustable counter poises, a, substantially as shown and described for the purposes set forth.

[The work performed by this machine has been hitherto executed by hand labor. The hide is placed on a revolving table, and the tools for scouring, smoothing and stretching it are placed in a frame over the table, and made to act with such a graduated pressure as the attendants find necessary to produce the best effects on all parts of the hide. It does its work expeditiously and in a superior manner.]

PLOWS—C. B. Ingersoll, of Morris, Ill.: I claim the standard, A, in combination with the standard arms A', A'', and shear bar, E, constructed and arranged in the manner and for the purpose set forth.

[This invention prevents all possibility of the land side of the plow becoming clogged while plowing in damp and marshy soils. The improvement consists in attaching the landside handle to a support projecting out from the rear of the plow standard, instead of to the shear bar, and thus avoiding any obstruction to the escape of the soil.]

FOOT STOVE—J. W. Lefferts, of Brooklyn, N. Y.: I claim the lamp D, fitted or placed within the cylindrical chamber, C, of the box B, the lamp being constructed in annular form, so as to have a passage, b, through its center to feed the flame within, and the box B fitted within the case, A, the box B being provided with the perforated or reticulated plate, d, plate e, with passages, f, and draught pipe, g, the whole being arranged substantially as described for the purpose specified.

[This portable foot stove is heated by a lamp arranged within a small metal box within the case of the stove, in which it is held perfectly in place, without the possibility of being thrown out or jolted about. It is a good and safe foot stove for carriages and sleighs.]

PLOWS—E. D. and L. W. Lozz, of Speedsville, N. Y.: We claim the combination of the adjustable cutter and the reversible mold board, when operated substantially in the manner and for the purpose fully set forth and described.

RAILROAD SNOW EXCAVATORS—S. Y. Ludlum, of Oyster Bay, N. Y.: I claim the tilting box or scoop F, attached to the sliding frame, B, and provided with the rod or cutter, D, and hinge sides, o, one or both; the frame being attached to the truck, A, and the box F and rod or cutter D, operated by the locomotive through the medium of the cord or chain, r, the whole being arranged substantially as described for the purpose set forth

[This is a snow digger, lifter and depositor, designed to remove deep snow from tracks when the common snow plow is unfit to perform the work. A scoop, having a cutter, is attached to a sliding frame placed in front of the locomotive, and this scoop digs into the snow, lifts up a scoopful on the sliding frame, and tilts it to one side of the track, the engine doing the work.]

SOWING GRAIN IN DRILLS—Frederick Moehlmann, of Belleville, Ill.: I do not claim a double chambered hopper, nor a turning reversible partition for separating the chambers of the same.

Neither do I claim broadly the use of a distributor composed of two circular slotted plates, one placed above the other and one stationary, and the other capable of turning irrespective of the position of the slots in said plates relatively to one another, and the form of the slot in the upper plate.

But I claim having the curved slot of the upper stationary plate terminate in the form of a scroll or letter C, and the slot of the lower plate arranged in such relation to the same, that as the lower plate turns, the seed in order to escape, as they are forced along on a curve by spurs of the turning plate, shall be compelled to take a direction toward the axis of the plate, and thus be saved from being cracked or broken by being compressed between the terminations of the upper and lower slots substantially as set forth.

[These improvements made by Mr. Moehlman in the seed drill are very useful, and worthy the attention of farmers generally. They effectually prevent the cracking or mashing of the grain in its passage to the seed tube, and also provide for a free and regular feed from the hopper, and likewise enable a farmer to plant either wheat, rye or oats with one implement with unerring certainty]

CORN PLANTERS—Wm. T. Pepyer, of Rising Sun, Ind.: I claim, first, the arrangement of the flanges, B, b, on the periphery of the wheel, a, when used in connection with the plate, n, scrapers d, and receiving or conducting spout, o, or their equivalents, the whole being arranged and operating in the manner substantially as and for the purposes set forth.

Second, The rocking seed box, l, having its lower end held stationary during the act of planting, by contact with the ground, and operated automatically by the power by which the machine is drawn forward, in the described combination with the falling floors, f f g g, and seed measuring and delivering mechanism, n o p, operated by means of racks, j, by depressing the box against the ground as set forth.

VALVE CONNECTIONS FOR STEAM ENGINES—B. L. Phillips, of Providence, R. I.: I claim interposing the jointed bars or rods, L L' to be operated upon by the cams, O O', or their equivalents, between the valves and the connecting block F, substantially as and for the purposes set forth.

[This invention is applicable to puppet, slide, or rolling valves. It consists in certain devices and their arrangements for connecting the cut-off valves with the valve gear through which they derive motion from the engine. The valves are allowed to be closed suddenly, by springs gravitation, or by the pressure of the steam, to cut off the steam at various points in the stroke, without disconnecting them from the mechanism as is done in other contrivances for giving valves a "tripping movement."]

CORN PLANTERS—Sylvanus Richardson, of Jericho, Vt.: I claim the seed cylinder, 10, operated by spring 12, in combination with slides 6 and spring valve 7, constructed in the manner and for the purposes set forth.

VALVE GEAR FOR STEAM ENGINES—Saml. Swartz, of Buffalo, N. Y.: I claim, first, The tappet or valve lifter upon a wheel or segment, and giving said wheel or segment a rotary motion, in combination with a reciprocating motion for the purposes substantially as set forth.

Second, I claim arresting the reciprocating motion of the said wheel or segment, and commencing its rotary motion at a point where its rotary motion will cause the tappet to strike the valve toe on a line, (or nearly so,) drawn through the center of the joint, and perpendicular to the line of reciprocating motion for the purposes and substantially as described.

CONDENSING APPARATUS FOR SALT AND GASES—J. C. Fr. Salomon, of Baltimore, Md.: I claim the combination of a series of blast pipes, c, and free air or water passages, c', with a succession of receivers, k, arranged and operating substantially in the manner and for the purposes set forth.

STAMP LABEL STICKER—Coleman Sellers, of Philadelphia, Pa.: I claim the combination of the lips or flanges, or their equivalents, in the label holder, with the follower, or its equivalent, for the purposes above specified, when said lips or said follower, or their equivalents are made of such form as to cause the stamps or labels to bulge out beyond the face of the stamp holder, substantially as described.

I also claim the attachment of the follower, or its equivalent, with the handle, to convey the pressure directly to the stamps or labels, substantially as described.

REFRIGERATORS—J. C. Schooley, of Cincinnati, O.: I do not claim the use of an opening to admit external air into ice, nor do I claim the use of an opening to allow air to escape after having passed into the preserving chamber.

Neither do I claim the use of a partition between the ice and preserving chamber, with its openings above and below: I do not claim any of them separately.

But I claim the employment of the double register, r, and openings, e d, in combination with the partition, f, and the openings, f m, the whole arranged and operated substantially in the manner and for the purposes set forth.

BENDING SHEET METAL PANS—E. A. Smead, of Tioga, Pa.: I claim the two levers, L L, operated through the medium of the arms, r r, which are attached to the sliding bar, I, the lips or jaws, t, of the levers working over the blocks or beds, N, the parts being arranged specifically as shown for the purpose set forth.

WIRING TIN PANS—E. A. Smead, of Tioga, Pa.: I claim the combination of the segment bar, P, vibrating bar, Q, and bed E, the bar P, being operated from the sliding bar, I, through the medium of the link, s, and the bar Q, being actuated by the beveled or inclined projections, b, the whole being arranged as described for the purpose set forth.

[These two improvements in machinery by Mr. Smead for making tin pans—one for bending the metal and the other for wiring the pans—enable the tinsmith to make such utensils of a superior quality. The devices and operation of these machines are not like those of common rimming and wiring machines for pans, but are constructed and operated on the principle of swedging and die pressing, and thereby produce beautiful and accurately finished work—free from the rough seams so common in such pans.]

GANG PLOWS—Joseph Sutler, of St. Louis county, Mo.: I claim the combination of the plows, D, with the frame B, and pivot O, arranged and operated in the manner and for the purpose set forth.

PROPELLER CANAL BOATS—G. W. Swartz, of Buffalo, N. Y.: I am aware that what are called iron boats have heretofore been constructed; I am also aware that boats are built of wood, using iron bolts, rods, bars, screws, &c., &c., for the purpose of connecting and fastening the wood parts together, and for strengthening and protecting the same. I make no claim to such.

Neither do I claim the combination of iron and wood as material used in the construction of vessels.

Neither do I claim substituting iron for wood, or wood for iron, in the construction of any part or parts of a boat or vessel

I claim so forming the recesses in the plates that they may protect the propeller, and give direction to the current of water moved by the propeller, substantially as set forth.

ELEVATING WATER BY COMPRESSED AIR—Archibald Thomson, of Detroit, Mich.: I do not claim the raising of water by compressing or forcing air into a chamber or reservoir, irrespective of the means employed for attaining efficiently said result.

But I claim the reservoir or tank A, formed or provided with two compartments, b c, which are provided respectively with valves, e g l m, operated as shown, the compartment, b, being provided with the air forcing pipe B, and eduction pipe C, the two compartments by the action of the valves communicating intermittently by means of the pipe, d, and passage f, the whole being arranged substantially as described for the purpose set forth.

[This invention has for its object the raising of water in a steady, continuous stream, at any required hight. It consists in having an air pump connected with a tank immersed in a stream or well, the tank being provided with valves and divided into two compartments, so arranged, that by forcing air into one of the compartments, a continuous stream of water is forced up from the tank to a hight commensurate with the power applied to the pump.]

CULTIVATOR PLOWS—Micajah Tolle, of Newport, Ky.: I am aware that various forms of hoes and harrows having their teeth placed obliquely with the line of draft, have been employed, both for removing clods and covering seed, and also that oblique arrangements of teeth in various forms exist commonly in harrows, cultivators, &c.

I claim the bracket, c, in combination with the plow beam, d, constructed, arranged and operated in the manner substantially as and for the purposes set forth.

EXCAVATING MACHINES—Alonzo Taggart, of Warrentown, Mo.: I claim the free draft connection of the scraper by chains, c c, in combination with the balancing suspension chains, a a, and the opposite stay chains, b b, arranged and operating in connection with frame and windlass, substantially as and for the purposes set forth.

SNUT MACHINES—James Tompkins, of Liberty, Pa.: I claim constructing machines for cleansing grain of two cylinders, one placed within the other, and of two sets of beaters secured to one shaft passing through these cylinders, the whole so arranged that grain being cleansed may be subjected to two separate and distinct agitations in the one machine, substantially in the manner described.

MOWING MACHINES—J. R. Wardwell, of Methuen, Mass: I claim supporting the finger bar and cutting apparatus from the main shaft, substantially as described.

PROPELLING VESSELS IN SHOAL WATER—J. W. Wetmore, of Erie, Pa.: I claim the arrangement of the arms, g h and k l, and e f and i j, in relation to each other and to the crank shaft and toothed wheel, as and for the purposes set forth.

GAS GENERATORS—E. W. Whitehead and J. L. Conklin, of Newark, N. J.: We claim the construction and arrangement of the retort as described, having two flues on opposite sides for strengthening the same, and leaving a larger portion of the walls of the retort for the direct action of the fire in the manner and for the purposes specified.

UMBRELLAS AND PARASOLS—James Willis, of London, Eng. Patented in England March 24, 1856: I claim my manufacture of the runner and slider and top joint collar as made with its notched flange of drawn or rolled metal bent into a ring, and constructed in manner and applied thereto, substantially as described.

I do not claim confining either the rib or the spreader of an umbrella frame to its grooved notched ring or

flange of the slider or top ring by means of a circular wire.

Nor do I claim confining said wire in place by twisting its ends together in the usual way.

But I claim my method of confining the wire in the flange, viz., by means of a flange made tubular or with a groove and space formed to admit and receive the circular split ring of wire, as described and bent down laterally on the ring and between the spreaders or ribs as specified, the same not only causing the wire to be grasped between each two joints of the spreaders or ribs, but providing a smooth flange without any projections likely to tear or injure the cloth cover of the umbrella.

MACHINE FOR SKIVING BOOT COUNTERS—William Butterfield, of Boston, and Bradford Stetson, of Uxbridge, Mass., assignors to themselves and Elmer Townsend, of Boston, Mass.; We claim the combination and arrangement of the secondary or adjustable feed roller and skiving cutter with the driving and feeding shafts, and the primary or stationary feed rollers and skiving cutter, the whole being made to operate as specified.

MACHINES FOR GRADUATING LINEAL MEASURES—S. C. Hubbard, (assignor to C. C. Hubbard,) of Middletown, Ct. Ante-dated Dec. 16, 1856: I claim in combination with dies for imprinting the figures and transverse lines upon the rule, graves or points, arranged and held as described for marking the gage or longitudinal lines on the rule as described.

I also claim the pressure disk, D, with one or more indentations on its periphery corresponding to the knuckles of the joints of folding rules when this is combined with giving to the disk thus constructed a self-acting reverse motion, to bring it back after each impression of a rule to the precise point whence it started, substantially in the manner and for the purpose specified.

STEAM PRESSURE GAGES—J. H. Miller and John Kailey, (assignors to themselves and John Danner) of Canton, O.: We claim the bell-shaped end of the mercury tube, d, and the manner of fastening the gum elastic floor to the bottom of said bell-shaped tube, d, by being clamped between the glass, d d, and the metal, P P, thus securely protecting the mercury from air, steam and water; this we claim when arranged and combined substantially as set forth for the purpose specified.

GAS STOVES—Patrick Mihan (assignor to himself and Robert B. Fitts,) of Boston, Mass.: I do not claim arranging a gas distributing tube and an air and gas mixer between two concentric surfaces provided with air inlets arranged so that air may pass with gas through the perforations of the mixer or cap only, as any arrangement involves something more than this.

Neither do I claim an annular gas burner arranged between two radiators, and having passages for air to pass between it and each radiator, and to the flame that may be generated above the exit holes of said burner, as I employ an air and gas burner, and not a mere gas burner.

Nor do I claim simply making the air and gas mixer or cap in a conical form, nor do I claim combining with a gas burner an ascending and descending flue, one being concentric with the other, and whether the descending flue is either within or without the other.

Nor do I claim the conduction of gas stoves as described on pages 86 and 87 of Webster's Encyclopædia, my invention differing essentially therefrom.

I claim arranging an annular gas distributing tube, G, a perforated or wire gauze mixer, I, two radiators, C and D, an air space within the radiator, C, and air inlet spaces, B E, the one leading air above, and the other below the surface of the mixer, substantially as described this arrangement involving, inclining the gas mixer, I, and the radiator, C, in opposite directions with respect to one another substantially as described.

I also claim the arrangement of the secondary radiator K and its discharge tube M, with reference to the radiator, C, the open air space within the latter, and the chamber, F, and the air and gas burning apparatus disposed at the bottom of said chamber, as specified.

SCREW WRENCH—G. C. Taft (assignor to H. W. Mason), of Worcester, Mass.: I do not claim the mere addition of auxiliary screws to the wrench of the said Coes, and made with threads reversed in pitch with respect to the pitch of those of the primary screws.

But I claim arranging the nut G, between the two male screws, F and K, in connection with applying the auxiliary female screw, b, and its support, I, with reference to the handle and shank, substantially as specified.

PORTABLE STEAM SAWING MACHINE—S. R. Wilmot, of Watertown, Conn., and R. G. Fairbanks, of Brooklyn, N. Y.: We claim attaching a portable steam sawing apparatus to the object to be sawed, by attaching apparatus at one side of the saw only, as set forth.

We also claim the combination of an adjustable live clamping apparatus with the stock of a portable sawing apparatus the several parts of the combination being constructed and combined substantially as set forth.

We also claim combining the stock of a steam sawing apparatus with the mechanism for actuating the saws by means of feeding mechanism constructed and operating substantially as herein set forth, so as to feed the saw, into the object to be sawed, while the latter remains stationary.

We also claim locking the saw, and the mechanism winging therewith, to the stock, in the manner set forth, so that the parts of the machine may be rigidly connected with each other, so as to facilitate their removal from place to place.

We also claim connecting the swinging members of a portable steam sawing apparatus with the stock at a point intermediate between the pivots and the eximemity of the stock as set forth.

LADIES' SKIRTS—E. F. Woodward, of Brooklyn, N. Y.: I claim the employment of the spiral stiffener or cord for stiffening ladies' skirts, &c., together with the saturation thereof in manner set forth, and for the purposes specified.

FAUCETS—D. N. B. Coffin, Jr., of Newton (Center), Mass., assignor to the Boston Faucet Company: I claim the combination of the annular lifter or lifters guide and pin substantially as described, with or without the top incline for closing the valve shown in fig. 12.

I also claim pivoting the annular lifter or lifters at m.

SPRING BED BOTTOMS—George W. Dow, (assignor to himself and Walter F. French,) of Lynn, Mass.: I do not claim supporting a set of slats on springs arranged longitudinally in a bedstead or frame.

But I claim my improved spring bedstead or bed bottom, as made with two series of rests or bearers, BB, two elastic bands or belts, C C', and a series of transverse bars or slats, D D, arranged together, and in the bed frame, substantially as described.

PREPARING LIQUID ROSE PINK—John W. Perry, (assignor to James W. Gates,) of Boston, Mass.: I claim the combination of the ingredients described for producing a transparent liquid rose pink, to be used in imitating rose wood, &c., the same consisting of potash, ground red saunders wood, and gum shellac and water, mixed substantially in the proportions described.

KEEPER FOR LOCKS AND LATCHES—Andrew Patterson, of Birmingham, Pa., (assignor to J. H. Jones, of Pittsburgh, Pa.: I claim the employment, in combination with a blunt or round ended latch bolt in a double faced or reversible lock case of a keeper, the face of which is curved or made concave, in the manner substantially as described and set forth.

KNITTED FABRICS—Joseph Vickerstaff, (assignor to Martin Landenberger,) of Philadelphia, Pa.: I do not claim exclusively the production of a knitted fabric ornamented by the transposition of threads of different colors.

But I claim as a new article of manufacture a fabric knitted with threads of differing colors, and composed of two separate thickness, interlocked during the process of knitting, at any required intervals, by transposing the threads in such a manner that a knitted fabric may be produced, both sides of which shall present a plain uninterrupted surface of loops, and free from the loose unknitted threads common to other ornamental knitted fabrics.

VENTILATING VAULT AND PLATFORM LIGHT—John C. Wolvin, (assignor to George Peckham and himself,) of New York City: I do not claim ventilating holes and a gutter for vault lights in itself, as these have before been used.

But I claim the manner specified of securing the glass sections in place by the combined operation of the rebate 1, and clamping plate, f, as specified.

I also claim the groove, 3, in the flange, 2, on which the glass rests, to retain a cord of india rubber or other elastic material or cement, and make a tight joint with the glass, as specified.

I also claim the gutter, 5, formed at the center, c, of the radial bars, b, in combination with the perforated clamping plate, f, and pipe, g, as specified.

RE-ISSUES.

LOCOMOTIVE TENDERS—Ross and Thomas Winans, of Baltimore, Md. Patented May 23, 1854. Ante-dated May 9, 1854: We claim the tender with an upper and lower platform, in combination with and for the purpose of feeding with greater convenience the furnace of a locomotive steam engine, having upper and lower feeding holes, substantially as described.

LOCOMOTIVE FIRE-BOX—Ross and Thomas Winans, of Baltimore, Md. Patented May 9, 1854: We claim, in the construction of locomotive fire boxes, the downward and rearward inclination of the top or roof, in combination with the flat grate surface and the usual feeding hole or door, and with or without the fuel feeding boxes through the roof, as described.

GUIDING LINE FERRY BOATS OR FLYING BRIDGES—Wm. A. Jordan, of Thibodeaux, La. Patented August 5, 1856: I claim adjusting the boat, A, relatively with the cable or rope, x x, by the means described, or by any mechanism, when said mechanism is so arranged as not only to effect the adjusting or turning the boat, but also to retain it when adjusted, for the purpose set forth.

[This is an improvement on an old and useful method of moving ferry boats, and consists in having adjustable devices for setting a boat more or less obliquely with a rope stretched across a river, from bank to bank, the boat being connected with the rope by traveling pulleys, and held in the proper position to be moved across the river by the force of the descending current. When the boat has made a passage across to one side, the devices are shifted to set it in proper position to make the return trip, making the water of the river the ferry motor.]

FLOURING MILL—Joseph Weis, of Bordentown, N. J. Patented Jan 29 1856: I claim the tapering burr, F, when covered with steel plates, G, having teeth in dis-jointed lines, and oblique with the axis of the burr, in combination with the steel pieces, h, having also oblique teeth, but inclined in a contrary direction to those of the burr, and being dovetailed into projections cast to the shield, H, the said projections forming longitudinal grooves, I, running lengthwise on the cone and crossing the inclined dress, substantially in the manner and for the purposes set forth.

DESIGN.

STOVES—S. W. Gibbs, of Albany, N. Y.

ADDITIONAL IMPROVEMENT.

CUTTER FOR BORING WHEEL HUBS—Leonard S. Mearing, of Fall River, Mass. Patented October 4, 1853: I claim, first, an additional reamer in connection with the shaft, c, for the purposes set forth.

Second, I claim a serrated, notched, sickled or ragged edge of reamers, or as at y y and w w, for the purposes set forth.

The Missouri Lead Mines Again.

MESSRS. EDITORS—Permit me, through the columns of the SCIENTIFIC AMERICAN, to answer the many inquiries that have been made of me since the publication of my short note in your paper of the 9th ult. I presume all those who have written me on the subject are readers of your paper, and I therefore send you an answer to their inquiries.

I am by profession a physician, actively engaged in the duties of my calling, and in no way connected with the mining business. I had no speculation in view; my object was to direct the attention of mineralogists to the rich deposits of lead in this region.

The railroad alluded to is the south-west branch of the Pacific Railroad, which commences at St. Louis, and runs forty miles west to Franklin Depot, where it bifurcates; one branch leads up the Missouri river and terminates at the mouth of the Kansas river, on the western boundary of the State; the other branch runs through the counties of Laclead, Webster, Green, Lawrence, &c., and terminates in this county, it being bounded on the west by the Shawnee Indians. The river branch is completed to Jefferson City on the Missouri river; our branch is under contract to this place, and we think it will be completed to Massey's iron works by fall.

The general government gave to the State of Missouri the alternate sections of land extending back six miles on either side of the road, except where the land had been entered; in this case, they have the privilege of going fifteen miles on either side to get the quantity to make the six miles on either side.

The land where most of the lead has been discovered belongs to the railroad company, but no rent has yet been paid by the miners, as, by the terms of the grant, they are not allowed to dispose of the land until the road is finished to within twenty miles of the land proposed to be sold, so that the company, if they see proper, can sell their land twenty miles west of the finished work as they progress with it; but it is not expected they will sell any of the land until the road is completed, which, by the terms of the contract, will be four years from last December. The State has endorsed the bonds of the company for four and a half millions of dollars, and with the credit which the lands will give them, they will have ample means to finish the road to this place. Boonville on the Missouri river is the point to which we now haul our lead. Its price in St. Louis is six and one-half to seven cents per pound. Capital is wanted to pay for mineral as it is brought to the furnace. The smelters are generally responsible men, but owing to the great difficulty of getting lead to the river their means have become exhausted. Mineral can now be bought for cash at from twelve to fifteen dollars per thousand.

The lead is found at from twelve to seventy-five feet from the surface. The machinery needed is for pumping out the water and hoisting the mineral to the surface of mines. I think, from the description I have seen in the SCIENTIFIC AMERICAN of A. L. Archambault's portable steam hoisting and pumping engine, that it would be the very thing needed in the mines.

The face of the country is generally good, and well adapted to agricultural pursuits. There is a great quantity of land yet vacant in this country, but speculators are busy entering it every day; in a few years it will all be gone. The government price is $2·50 per acre for its reserved lands, six miles on either side of the road. A geological survey of these lands was made by Prof. Swallow; his opinion is that mineral will be found all through this and the adjoining counties.

H. S. CHENOWETH.

Neosho, Mo., June, 1857.

State Fairs for 1857.

The following State Agricultural Societies have designated the time for holding their exhibitions:—

Name.	Where held.	Date.
Indiana,	Indianapolis,	Oct. 4—10
Pennsylvania,	———	Sept. 29, Oct. 2
New York,	Buffalo,	Oct. 6—9
Ohio,	Cincinnati,	Sept. 15—18
Canada East,	Montreal,	Sept. 16—18
E. Tennessee,	Knoxville,	Oct. 20—23
Illinois,	Peoria,	Sept. 21—24
Iowa,	Muscatine,	Oct. 6—9
Kentucky,	Henderson,	Oct. 12—16
Maryland,	Baltimore,	Oct. 21—25
Massachusetts,	Boston,	Oct. 21—24
U. S. Ag'l S.'y,	Louisville, Ky.,	Sept. 1—6
Vermont,	Montpelier,	Sept. 30, Oct. 2
Virginia,	———	Oct. 28—31
W. Tennessee,	Jackson,	Oct. 27—30
New Jersey,	N. Brunswick,	Sept. 29, Oct. 2

The American Institute has taken a lease of the Crystal Palace for its next Fair in October, and will receive machines from July 5th up to the opening of the exhibition.

How Rain is Formed.

To understand the philosophy of this phenomena, essential to the very existence of plants and animals, a few facts derived from observation and a long train of experiments must be remembered. Were the atmosphere everywhere, at all times, at a uniform temperature, we should never have rain, hail, or snow. The water absorbed by it in evaporation from the sea and the earth's surface would descend in an imperceptible vapor, or cease to be absorbed by the air when it was once fully saturated. The absorbing power of the atmosphere, and consequently its capability to retain humidity, is proportionably greater in warm than in cold air. The air near the surface of the earth is warmer than it is in the region of the clouds. The higher we ascend from the earth the colder we find the atmosphere. Hence the perpetual snow on very high mountains in the hottest climates. Now, when from continued evaporation the air is highly saturated with vapor—though it be invisible—if its temperature is suddenly reduced by cold currents descending from above, or rushing from a higher to a lower latitude, its capacity to retain moisture is diminished, clouds are formed, and the result is rain. Air condenses as it cools, and, like a sponge filled with water and compressed, pours out the water which its diminished capacity cannot hold. How singular, yet how simple, is such an admirable arrangement for watering the earth?

Notes on Science and Foreign Inventions.

SULPHUR AND THE GRAPE DISEASE.—For several years past, the grape vines of Europe have suffered from a peculiar disease, by which the wine product has been greatly reduced. This evil has been severely felt in France, where the annual value of the grape crop amounted before the disease to over 300,000,000 francs, but which has been reduced to less than one-half. It has been found that the application of flour sulphur to the vines three times during one season cures the disease, and it is expected that its general application regularly pursued will bring all the vineyards of France back to their former fruitful condition. If the same disease should visit the vines on our continent, the above information will be very useful to those who cultivate the grape. The sulphur is mixed with some salt and water, and is applied with a brush.

BALLASTING VESSELS WITH WATER.—An excellent plan of ballasting vessels with water is coming into very general use in England. It is principally adapted for iron vessels, but is also applicable to those of wood. A large iron screw steamer, 250 feet long and 35 feet beam, for carrying coal, was recently launched at Newcastle, England, and constructed for water ballasting, as all vessels which carry coal from Newcastle to London have generally no return cargo, and must put in ballast to make the trip. Sand, gravel and stones have heretofore been used for ballast; the loading and unloading of such involves considerable labor and expense, but water ballast is cheap and only requires to be pumped in and out of the hold, and this is easily done, especially in a steamship. The above steamer has engines of 150 horse power, and capable of carrying 1500 tuns of coal. It has been found that the cost of carrying coal cargoes decreases in proportion as the size of the vessel is increased. This hint ought to be of some value to our Pennsylvania friends.

WATCH PROTECTOR.—A device for protecting a watch or purse in the pocket has been invented by Robert Mair, of the Royal Engineers, England. It consists of a circular slip of metal fitted into the pocket, embracing the watch tightly by means of a spring, which the weight of the watch is sufficient to bring into action. A button attached to the bottom of the device in the pocket is connected with a secret cord or ribbon outside, which the wearer pulls, and releases the spring to allow the watch to be taken out when required. This appears to be a very simple safeguard against pocket-picking. It is stated that it holds the watch so firmly that it cannot be removed forcibly without tearing the pocket. There is an American patent by Ruggles, which, in addition to the above, makes a loud ringing sound when the watch is drawn from the pocket. We consider Ruggles' decidedly preferable. The article is manufactured at Fitchburg, Mass.

PRINTING PRESS DRIVEN BY A COLUMN OF WATER.—In the town of Stirling, Scotland, the printing press of the *Observer* newspaper is operated by a column of water 450 feet high, conducted through a pipe only two inches in diameter, we are told, leading from the top of the rock on which the castle is built. The press is driven by a small water engine, the column of water to which is shut off and let on by a cock similar to that on the steam pipe of an engine. There are many situations in our country where a small high column of water could be applied to such like useful purposes, employing a small turbine wheel as the motor for applying the power. The press of the Boston *Traveler* is driven by the water of the Cochituate aqueduct, which is allowed to act on a rotary engine. The amount paid for water rent makes this more expensive than steam, but it greatly economizes space, a valuable consideration in the center of a city.

POISON IN THE FINE LACE MANUFACTURE.—Our wealthy ladies who wear fine Brussels lace are ignorant of the sad fact, we believe, that in its preparation the poor female operatives often lose their lives by inhaling a poison employed in removing finger marks from it. The poison is the carbonate of lead, applied in the form of powder, in the finishing operation. A portion of this is inhaled by those who use it, and their health soon gives way. Good wages are generally paid to those lace operatives, but so unhealthy is the business—so fatal has the lead poison proven in its effects—that it is only a work of dire necessity to engage in it. It is a sad reflection that many a rich piece of lace worn by a lady has cost not merely a high price in money, but the life of a fellow being. Lace manufacturers have long endeavored to find a suitable harmless substitute for carbonate of lead, but hitherto in vain, we understand.

New Inventions.

Improved Tubular Boiler.

The boiler represented in the accompanying illustrations is the invention of Mr. Frederic P. Dimpfel, and was patented by him some time ago. An engraving, as his boiler was then constructed, was presented on page 248, Vol. 7. It is capable of being used advantageously with any fuel, and is now in popular use on several locomotives as a coal burner. The degree of success which has attended its application for this purpose leads us to amplify somewhat on the difficulties to be overcome in coal burning.

Good dry wood is in many respects the best fuel yet known for locomotives. It lies loosely in the furnace, enabling the air to pass through its interstices freely, and it burns in such a manner that a portion of the fuel is decomposed, or changed into gas, to be burned as it escapes through the tubes, while another large portion is burned as it lies in the furnace, forming a glowing bed of soft, elastic, coherent, but not adhesive, fire. True, its combustion produces more or less smoke, which is very unpleasant in the nostrils or eyes, and it sometimes throws out sparks which destroy property, but these evils are trifling in comparison with those which usually attend the burning of pit coal.

All coals dug from the earth contain some volatile or gas-producing matter, and those which have but little we term anthracite. Now, whether we burn anthracite or coal containing more volatile matter or bitumen, the intensity of the heat cannot, as with wood fuel, be well controlled, and as a consequence some fuel and water are expended wastefully. Bituminous coal also makes much smoke, and the effluvia is such that coal-burning locomotives have been termed "stink-pots" by the people along some of the lines on which they are employed. Some coals melt and adhere together and stop the draught; the combustion of others tends to cover the grates with clinker, and all coal fires obstruct the passage of the air far more than do the large sticks of short wood generally employed in ordinary locomotives. This is a considerable evil, as the draught must be great and the fire intense in a locomotive, or the great amount of power required cannot be developed by a sufficiently small machine. Some coals, which are tolerably free from some of the above faults, crackle into fragments under the intense and sudden heat, and by the agitating motion of the locomotive are sifted through the grates to fill the ash pan, before they have an opportunity to become more than half or quarter consumed.

With the loss from the bad control of the heat, which involves a continuous great fire even though but little is wanted at times—with the loss of power in keeping up the draught, whether it be done by a fan blower, or by greatly contracting the blast nozzle through which the exhaust steam is discharged into the chimney—and with the loss of coal by dropping through the grates—it is sometimes found, even with locomotives adapted to the circumstances, that the actual cost of fuel is as great as with wood. Generally, however, it may be assumed that coal is sensibly the cheapest fuel, and the difference is becoming greater with each improvement in facilities for mining and transportation. Despite the evils, therefore, of sulphurous fumes, wasted coal, clogged fires, clinkered grates, and sundry additional ills of lesser magnitude, coal would come into very extensive use but for the existence of an evil which we have not yet alluded to.

The heat of fiercely glowing anthracite is frequently too intense to be endured by iron plates, even if they be cooled by the constant presence of water on the inside. The metal therefore warps, cracks, leaks, and "loses its life," in short, is *burned* under its influence, and it is found that the cost of supplying a new boiler or furnace, after a few months or years, according to circumstances, is alarming. The effect is especially severe on the tube-sheet, the part in which the ends of the tubes are presented to the furnace, and several devices have been patented with a view to protect this part from destruction.

The device represented in the accompanying figures provides not only for the quite thorough protection of the tube-sheet from the radiant heat of the fire, but ensures a very energetic circulation of the water in contact with that part, and also allows very completely for any inequalities of contraction and expansion of the parts. It frequently happens that owing either to a difference in the metals or to a difference in temperature, the tubes of an ordinary tubular or locomotive boiler are very much strained in their positions within the boiler. The tubes being copper or brass, for example, expand faster than the iron of the shell as the boiler becomes heated, and endeavor to lengthen themselves more than the increase of length of the shell will allow, an effect which is increased by the fact that the shell is only warmed by the heated water, and that by contact only on one side, or its interior surface, while the tube has the heated water on one side, (its exterior) and the far more heated products of combustion circulating within, so that both the nature of the metal and the higher temperature tend to make the tubes longer in proportion to the other parts than was the case when they were fitted to each other. The strain thus induced tends to loosen the tubes in their fastenings, as also does the opposite one when the fires are suddenly drawn, as under such circumstances the shell remains heated while cold air is allowed to be drawn through and cool the tubes.

DIMPFEL'S TUBULAR BOILER.

Fig. 1

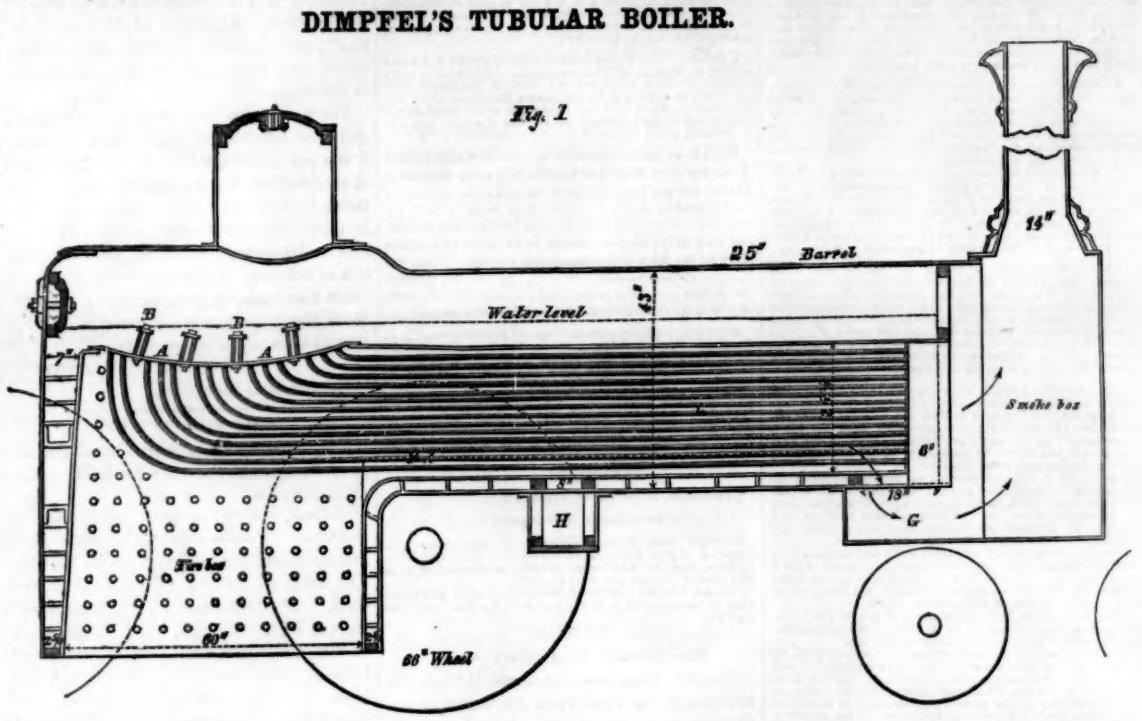
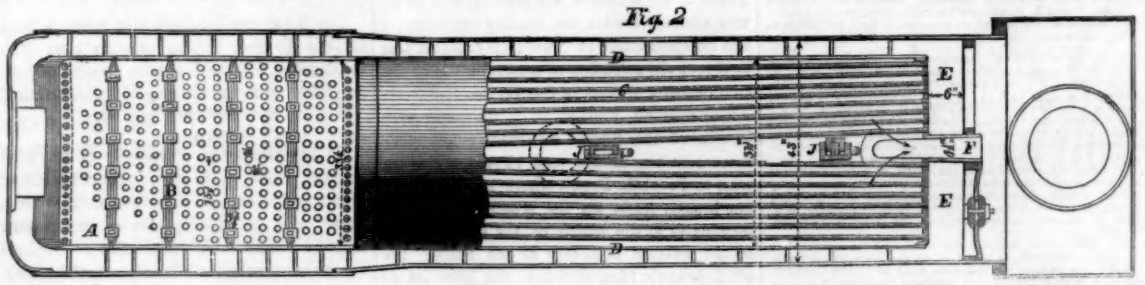


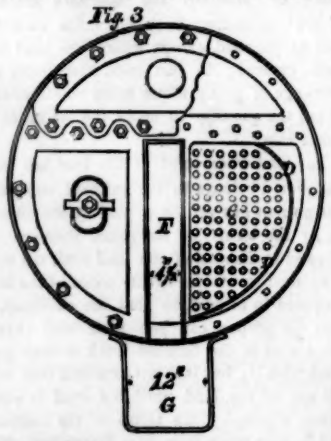
Fig. 2



The Dimpfel boiler has a large flue, D D, (Fig. 2) in the location where the tubes of an ordinary boiler are arranged, and this flue is filled with tubes, arranged as represented, so that water circulates within, while the heated gases flow along through the spaces between them. The large flue is not continued quite through the barrel of the boiler, except in a quite narrow space, F, and the products of combustion principally escape by descending through a suitable box G (Figs. 1 and 2) below. The tubes are so arranged as to receive the water from a water-space, E, (Fig. 2,) at the end of the flue next the smoke-box, and allow it freely to escape at the other, which enters the fire-box in the manner represented, and bends upward into the crown sheet, which thus becomes, in fact, the tube-sheet of the boiler. The water in the tubes is rapidly changed to steam, which, by reason of its levity, tends very powerfully to ascend and to drag with it the water with which it is mingled, so that there is always quite a rapid current through the tubes, water flowing in at the smoke-box, and water mingled with steam escaping through the upturned ends in the furnace or fire-box.

Externally the boiler resembles ordinary locomotive boilers, and the principal parts are denominated by the same terms. The crown sheet, A, is supported by stay bars, B, as usual, but the sheet is depressed in the center, so that the section forms a portion of a circle. This form allows a less number of stay bars to suffice for its support. The active circulation due the rising of the water through the tubes, C, prevents the collection of any non-conducting deposits in the hollow top of the crown sheet. The flue, D, in which the tubes are enclosed, is itself very efficient heating or steam-generating surface, and as the tubes are equally small, numerous and closely packed, and project considerably into what is usually the empty open space in the top of the furnace or fire-box, it follows that the heating surface is not only more efficient in consequence of the free and rapid circulation of the water, but is considerably greater in a given volume of boiler than when the tubes are arranged in the ordinary manner. It is by no means extraordinary to find in the common tubular boilers strong indications that the water has been at times almost entirely expelled from the narrow spaces between the tubes, but the Dimpfel boiler allows no possibility of such an effect being produced, as a clear space always exists for the water to flow freely in at the front end, and to escape from the upturned ends at A, with great rapidity, whether in the form of water or steam. The current through these tubes has in some instances been so active as to carry a half-inch bolt through, and deliver it on the top of the crown sheet.

Fig. 3



E represents the narrow space referred to as that from which the tubes receive their supply. F is the vertical opening therein, through which a portion of the products of combustion flow to the smoke box, but this is insufficient to discharge the whole, and the remainder is compelled to descend and escape through the box G. H is a small chamber designed to catch any small coals or cinders which may be drawn along the flue, D, by the draught, and by removing a simple plate at its bottom, it may be emptied at each trip; but it is not deemed very essential in practice, and is omitted in some. The presence of the space, F, necessitates a corresponding division of the tubes, C, and to prevent the draught from flowing through this space without heating the tubes, it is usual to insert the dampers, J, which are so made as to be closed up, and readily inserted through F, and subsequently to be expanded to the condition represented.

The boiler presents a very extensive and efficient heating surface, so arranged as to but slightly retard the draught. A very powerful large engine of this style built by the Taunton Locomotive Manufacturing Company, and running on the New York and Erie Railroad with anthracite alone, runs the express train at the ordinary speed, with a blast opening five inches in diameter, showing that a less powerful blast is required than is usually necessary with wood burners. We have before us a number of certificates from master mechanics and superintendents, showing that little or no trouble has been experienced in practice from leaks or other difficulties.

For further information address the inventor, F. P. Dimpfel, Philadelphia.

Scientific American.

NEW YORK, JUNE 27, 1857.

Progress of Railroads.—The Great West.

The opening of the Ohio and Mississippi Railroad, which took place on the 5th inst., was an event long to be remembered by those who were permitted to participate in the ceremonies. By an arrangement made with the various railroad companies of the east and west, from three to four thousand excursion tickets were issued, and on the first of the month a regular hegira began to pour over the great avenues of trade leading westward. It was a very pleasing feature of the whole affair that no serious accident occurred to mar the pleasure of the occasion; and the inception and termination of the whole event reflects great credit on the directors of the company under whose management it was carried out. Many of the business and professional men of the east had never before visited the great West; and probably hundreds who joined this excursion would have lived and died ignorant of its true character, had not this opportunity been presented to them.

The new link of railroad which led to this celebration is one of a great national chain extending from the lumber regions of the Penobscot to western Missouri. Commencing at Bangor, Me., this chain passes through a majority of the largest cities in our country, such as Boston, New York, Philadelphia, Baltimore, Cincinnati, and St. Louis. The whole length completed, is one thousand four hundred and forty-six miles; the Ohio and Mississippi link, just finished, is about three hundred and thirty-nine miles long—from Cincinnati to St. Louis. We arrived at the "Queen City of the West"—the name given by the Buckeyes to their beautiful commercial emporium—on the evening of the 5th, and left early next morning on the grand excursion; we therefore had no opportunity of visiting the various places and objects of interest in this growing center of business in the Ohio valley. At St. Louis, however, we had two days to spare, and spent them pleasantly in the examination of objects interesting to the friends of industry, science and art. Owing to its favorable position, St. Louis is the metropolis of the Mississippi valley; it is even now a great and wealthy city, but when the vast natural resources of Missouri and the metallic products of the West are fully developed, she will be an Ajax among the commercial emporiums of the New World. The national chain of railroad we have described will be continued in a few years to California, and thus unite in iron bands the two great oceans of the world. St. Louis, being situated on the west bank of the Mississippi river, will always be a natural depot of this great continental highway, and cannot fail in rising to magnificent proportions.—Many of its citizens are men of cultivated tastes, and devoted to scientific pursuits; it has an Academy of Sciences, with an excellent museum, embracing a good collection of geological and anatomical specimens. In this particular feature it is a step in advance of New York, which cannot yet boast of such an institution. It is remarkable for the number and the beauty of its public buildings; has a population of over 100,000 inhabitants, and a water communication of 8000 miles extending in different directions. It is also connected to the great northern fresh water seas of our inland navigation by the Chicago and Alton railroad, which passes through the most fertile regions we have ever had the fortune to gaze upon.

On our return journey we tarried at Chicago which is *the* great city of the Northwest. It was only incorporated in 1836, with a mere handful of inhabitants; now it has a population of 100,000, and is the center of the upper lake commerce. A very large capital is invested in the manufacture of steam engines and railway cars; and it is the focus of the manufacture of agricultural implements for the western farmers. We were particularly struck with this branch of her manufactures. Thousands of reaping machines are annually made, and they have proven to be one of the greatest benefits ever conferred upon our agricultural population, especially those on the vast western prairies, for which they are so eminently adapted. Chicago is the greatest grain and lumber market in the world; and its rapid progress seems almost like a supernatural result, it having nearly doubled its population within the last five years. From Chicago we returned rapidly by the Erie route to New York.

This excursion imparted to our mind higher ideas of our country's greatness and natural resources than we had entertained before, especially the rapid progress of its railroads—those grand avenues of our inland commerce. In a few days we passed over 1093 miles of railroad, from New York by way of Pittsburgh and Cincinnati, to St. Louis, then up to Chicago, 280 miles, thence to New York, 973 miles—forming a round of connected railway 2346 miles long.

When we look upon the rapid development of our railway systems, it is scarcely possible to over estimate the grand results which they have effected in the growth of our internal commerce and the development of our national resources. We know that along the lines of all our railroads thrifty villages have arisen as by magic, where now, but for them, there would have been only silent standing forests and untilled prairies. They have provided the means of transport between distant cities and without such agencies we know that commerce can neither *flourish nor progress.*

We have avoided alluding to the speeches, scenes and incidents of this public demonstration; these, with their attendant festivities, have been described by reports in the daily papers, and would not now interest our readers. We have been briefly statistical with our experience on the occasion, for the purpose of conveying a somewhat clear idea of the extent of the railway conveniences now provided for commerce and travel between the important cities and towns in our country.

In 1836, the year when Chicago was organized into a city, there were only fifteen miles of railroad in operation in New York, and not a mile in Ohio, or any of the States west of Pennsylvania. It took two weeks to reach Chicago from this city by the best methods of river, canal and lake navigation; now we can travel the same distance in two days by railroad. In that year it required a month to go from New York and back round by Chicago to St. Louis, a distance which can now be traversed in five days. Such are some of the wonders achieved in traveling by our railroads in twenty-one years.

Brick Cylinders in Sand for Bridge Piers.

About seventy miles from Madras, a bridge of fifty-six arches, each thirty feet span, has been built on the river Poiney, on the line of a new railway. The bed of the river is sand of unknown depth, and it was necessary to lay a deep artificial foundation for the piers. This was accomplished by using cylinders made of cemented brick. Each pier is founded on fourteen cylinders built of radiated brick, each five feet external diameter, and two and a half feet inside diameter. These were sunk close together to the depth of fifteen feet below the level of the river, and then filled with broken brick, and the interstices between with stone. On the top of these the masonry of gniess rock commences. This rock is quarried in the neighborhood by the action of fire, which causes it to split off in layers from three inches to three feet thick. This may be a useful hint to those who quarry this kind of rocks, so common in the neighborhood of New York.

The building of bridges in India upon brick cylinders is a very old, and is stated to be an excellent method. These cylinders are sunk in the sand as follows:—A native fixes a plumbline as a guide to the top of the cylinder, which is built on the sand, then descends inside with an instrument similar to a hoe in shape. With this he excavates the wet sand, which is drawn up with a bucket attached to a cord passing over a pulley at the top. As the sand is excavated inside the cylinder, it descends in the same manner exactly as the iron cylinders represented on the first page of Vol. 8, SCIENTIFIC AMERICAN. A brick cylinder descends about two and a half feet in twenty-four hours, and relays of workmen are employed day and night to keep it sinking, until it has attained to its proper depth, otherwise, were the work stopped in its progress, the sand would pack in and around it so firmly that it would cease to sink. In some situations in our country this method may be very useful for the foundations of piers, but not where good timber, such as oak, chesnut, or cedar piles can be obtained cheap, as these are just as durable as brick when entirely excluded from the atmosphere.

Live Fences.

In European countries the well-tilled fields look delightful in summer, fringed as they are with live green fences, which are kept trim and neat by being annually cropped with shears or a hedge-knife. The American manner of fencing fields with rails and boards is the reverse of the picturesque. Timber fences also commence to decay from the day they are first put up; they require frequent repairs, and do not last many years. Where timber is plenty, however, they are certainly the most convenient, for they can be put up expeditiously; but where timber is dear, our farmers should leave no experiment untried to secure the enclosing of their fields with durable live fences. Hawthorn, which is the most common fence material in Great Britain, does not stand our climate well. Trials with it have effectually proven this to be so. In Europe, live beech hedges are not uncommon, and they might answer a good purpose in our climate. They are cultivated by planting young beech trees thickly set together in rows, and afterwards keeping them trimmed close every year with large shears. Their hight is generally about six feet, and the constant cropping of them makes the hedge to grow thick and impenetrable to cattle, and during summer when in full leaf, they are beautiful. The osage orange fence has been cultivated with some success in our Southern and Western States, but it is stated to be unable to withstand a colder climate further north. Locust fences have been tried in many parts, but they do not grow so thick near the roots as is required for fences.

We are not aware if ever the American hawthorn has been tried; at least, we have never seen a fence of it. It is our opinion it would make an excellent and durable live fence, if properly cultivated; and we hope our farmers will make experiments to test it for such purposes. We call their attention to it now, in order that they may gather the fruit, (called thorn apple by some and *haws* by others,) a small red berry, in season, and plant them in the fall. Such shrubs grow wild in many sections of the country; the spikes or thorns are large, and the branches become strong and thick. We have not the slightest doubt, that when planted and kept annually cropped, such fences would grow thick and quite impenetrable to animals.

States Weights and Measures.

The Legislature of New York, at its last session, passed a law defining the weight per bushel of certain articles as follows:—Indian corn, 58 pounds, wheat, 60, beans, 62, peas, 60, clover seed, 60, potatoes, 60, rye, 56, flax seed, 55, barley, 48, buckwheat, 48, timothy seed, 44, oats, 32.

This law is of no great account, because the question of weights and measures is one over which the United States Government alone has the constitutional control. A uniform system is what is wanted, not a zebra complication of acts by the different States, which only tend to increase commercial difficulties between them.

A United States bushel is simply a measure of capacity=2150.42 cubic inches. Ohio, Pennsylvania, Maryland and New York have laws relating to weights and measures, all agreeing as to the weight of a bushel of wheat, (60 lbs.,) but not as to corn, a bushel of which, in Philadelphia and Ohio, is 56 lbs.—two pounds less than in New York. In Ohio the weight of a bushel of oats is 32 lbs., the same in New York, and in Philadelphia 24 lbs. Is not this a harlequin system for different States under one general government? We hope the next Congress will not neglect this question.

We have looked in vain for a compliance with the above law since it was passed, by retail dealers in New York. They ignore it in a most calm and philosophical manner. We do not believe that a single person in this city sells potatoes with the least regard to their weight per bushel.

The Atlantic Cable and the Niagara.

In our last number we quoted the Liverpool (Eng.) *Albion* as authority for the statement that the *Niagara* had been examined by a committee of the Atlantic Telegraph Co., and found unfit for the duty she was sent to perform, namely, to carry and lay down part of the great ocean cable. By the late news from Europe we find that the information of the *Albion* was incorrect, at least, the London *Times* says it is, and we consider it good authority. She was to leave the Thames on the 18th for Portsmouth dockyard, where some of her staunchions were to be taken out, and her ward-room altered, to admit the cable, when this was done, she was to proceed at once to Birkenhead (opposite Liverpool) to take in her share of the cable. It appears that the ship was judged unsuitable *unless these alterations were made*, and this induced the report published by the *Albion*.

The consumption of fine wire for the telegraph cable has been greater than could be furnished by all the wire-drawers in England; this has delayed its completion. After the preparations are perfected, all the vessels of the squadron which are to be engaged in the undertaking are to rendezvous at Cork, on the south-west coast of Ireland, where final arrangements are to be made. The war steamer *Cyclops* is now engaged in taking soundings along the proposed sea route for the cable, which is designed to be laid in August.

Arsenic in Silk.

"In France, lately, some workmen fell sick in working on an apple-green dress. A piece of the silk was examined by a chemist, and was found to have been colored with copper and arsenic. These substances adhering but slightly to the silk, were detached in handling, in the shape of powder, and were thus inhaled in the lungs. An order was issued, prohibiting the future use of this kind of coloring matter. Many of these silks are supposed to have come to the United States."

The above paragraph we have taken from one of our exchanges in order to say that we do not believe such an event as that stated ever occurred. It describes the green silk dress as having been dyed with copper and arsenic, a process which requires the use of a strong caustic alkali, and this would destroy the luster of the silk, and give it a *cottony* appearance. A French dyer would take care not to do this.

Canada Railroads and the Great Eastern.

The Directors of the Grand Trunk Railway, Canada, have announced in circulars that they have entered into arrangements with the proprietors of the above leviathan steamer that it shall make its first voyage to Portland, Me., and possess a thorough booking system in connection with the railroad, for the conveyance of passengers from England to America, through Canada to the Western States.

Changes in the Patent Office.

Mr. Galphin, of the draughtsman's room, has been appointed assistant examiner to Mr. Lane, in place of Dr. Breed, resigned. We have no doubt he will make a faithful officer. Mr. Moss, who lately resigned, will leave the Office on the 1st prox., with the intention of making a journey south. He has been an efficient faithful officer, and his absence will be a loss to the Patent Office.

Great Iron Viaduct.

There is now being erected over the Jordan river, on the line of the Catasauqua and Fogglesville Railroad, Pa., a viaduct wholly of iron eleven hundred feet long. When finished it will be the longest iron bridge on our continent.

[For the Scientific American.]

The Electro-Magnetic Engine.

MESSRS. EDITORS—The article which appeared in your valuable paper of the 13th inst. on my electro-dynamic engine, exhibited in the Crystal Palace a few days since, brings into view the main issue on which must finally depend the decision to be made by capitalists, and others, as to the practical value and availability of my invention. Its superior simplicity of construction, economy of space, freedom from explosion, and continuity of action, when brought into comparison with the steam engine, will hardly be contested. The consideration commending itself to your judgment relates to the comparative economy of electricity thus employed with steam for a motive power. In view of all previous efforts to render electricity available, some doubt might be reasonably entertained on this score. The working cost of the engine on exhibition does not exceed two dollars per day, a sum which might easily be lessened, by the disposal of the sulphate of zinc produced by the action of the galvanic battery, as well as the residuum of the acid. Admitting your estimate that a steam engine of 10 horse power consumes but one dollar per day of ten hours, it can be shown that my engine is more economical, even were the cost of running it three times the present amount. Let us suppose the two applied to navigation. A small vessel with the steam engine on board, and intended to run, say from New York to New Orleans, will have all her remaining space taken up with coal, leaving no room at disposal for merchandize; whereas on a vessel of similar tunnage using my electric engine, the demand of the stowage required by the nitric acid (the only fuel to be stowed) would be so limited, that the assumed increase of cost would be more than compensated in this respect. Indeed, so great would be the advantage that even the electric engine already exhibited by me, could be thus at once advantageously adopted. The contrast between the economy of the two motor powers will be yet more strikingly evident, by a supposed enlargement of the vessels to any wished for extent, furnished with proportionately sized engines; for, if the new steam engine be found to cost one hundred times more than the former, that is to say, should cost one hundred dollars in ten hours, it certainly will not yield one thousand horse power; whilst on the other hand, at a cost of sixty dollars per day, my electric engine would yield 2500 horse power.

The experiments made at the Crystal Palace on the two electric engines have already proved that the larger one, with twenty times the amount of electricity supplied to the smaller one, produces over five hundred times the power. Accepting this as a basis of calculation, the above follows as a result. Thus, with an expense of less than two-thirds of that of the steam engine of the above stated dimensions, the electric engine is found to yield a power more than double. The advantage of applying this electric engine to navigation, whether to large or small vessels, is thus rendered apparent; this advantage must increase in an enormous ratio with the size of the hull to be propelled, in respect to any electric engines adapted to it. Extraordinary as this result may appear, it may easily be conceived, when one takes into consideration the fact, that electricity permeates the whole mass of ponderable bodies submitted to its action, and does not merely act on the surface as steam does. It follows that the mass is the direct measure of the pressure of electricity, whilst its comparative working expense proceeds on a decreasing scale, this being measured by the *surface of the battery*. Steam, on the contrary, acts only on the surface of the body to be set in motion, and the measure of its pressure is necessarily restricted to this surface, whilst the cost is represented by the *mass* or cube of the dimensions; thus the inertia of the mass, increases at such a rate as to set a limit to the size to which a steam engine can be advantageously constructed or economically worked.

Finally, I would observe, that in electricity the *expense* is measured by the *square* of the homologous dimensions, and the *power* by the *cube* of the homologous dimensions, whereas in steam, the expense is measured by the cube, and the power by the square of their homologous dimensions. M. VERGNES.

New York, June 18, 1857.

[We will present our views briefly on the only point which we think deserving consideration, namely, the possibility of the above engine becoming a useful motor like the steam engine. Prof. Vergnes' states that the "main issue on which must finally depend the decision to be made by capitalists, and others, as to the practibility and availability of the invention," is "its superior simplicity of construction, economy of space, freedom from explosion, and continuity of action when brought into comparison with the steam engine," and these advantages, he says, "will hardly be contested."

We widely differ from him in this opinion. We admit that no explosion can take place in the batteries of his engine, as with a steam boiler; but his engine is neither as simple nor compact as a steam engine, taking the latter with all its appurtenances. His large electro-magnetic engine in the Crystal Palace, which is not claimed to exert more than 10 horse power, (and which, we believe, from mere inspection of its operation, is not five,) with 128 cups of battery, occupies more space—engine and battery—than many steam engines working up to 20 horse power. It is a mistake to consider the steam engine a complicated machine; it is a most simple motor. We had no means of measuring the length of the arms of the electro-m agnetic engine; but, judging by the eye, they form the spokes of a revolving wheel not less than eight feet in diameter, and the engine is only 10 horse power. We are positive that it is impossible to run large engines of this character, for they would soon shake themselves to pieces by the centrifugal action generated.

It would be gratifying to us were electricity harnessed so as to operate economically as a motive agent, and thus become a substitute for the steam engine, but electrical engineers, in our opinion, are still very far from the attainment of such a result. If electricity could be applied as a practical motive agent, we can easily conceive the many advantages it would possess over steam. From a grand reservoir of batteries the electric fluid could be supplied through insulated wires to work engines in every part of a city, in the same manner that gas is furnished to support illumination in stores, houses and workshops.

In the experiments made at the Crystal Palace, every manifestation of an increase of power in the engine was only obtained by a similar increase of battery expenditure, just as in the steam engine. It is not by experiments like those alluded to, that we, or any mere looker-on, can investigate correctly the claims set up for this engine; nor are such experiments satisfactory in comparing its expenditure with that of the steam engine. Let a locomotive upon the same principle be built and tested with a steam locomotive, and then we can have a basis for comparing the merits of the two; or on a smaller scale, let the engines in the Crystal Palace be fairly tested with a steam engine in driving machinery, performing constant, every-day labor, such as printing presses. If this is attempted, we have no hesitancy (judging from mere inspection) to predict that it will not do as much work with twice the expenditure as a 5-horse power steam engine. At some future period Prof. Vergnes may (and we hope he will, for we wish him all success) so perfect his electro-magnetic engine that it will stand forth as the grand invention of the age. He is working in a hopeful field.

Who Invented the Menai Tubular Bridge?

MESSRS. EDITORS—Sir I. K. Brunel had nothing to do with the design or construction of the above wonder of the world. I notice, however, that in your correction of the Philadelphia *Ledger* on the subject, you have omitted the name of one of England's greatest engineers in connection with this matter, viz., Robert Stephenson. To him alone is the world indebted for the original idea of employing a hollow wrought iron tube for the purpose of carrying the Chester and Holyhead Railway over the Menai Straits. To William Fairbairn belongs the credit of having conducted the vast and costly experiments which were necessary before deciding on the *details* of this mammoth structure. It would be hardly fair to call Mr. Fairbairn the *inventor*, neither would it be just to give all the credit to Mr. Stephenson. The Menai bridge may be considered as their *joint production*. The Brunels, both father and son, have glory enough (not the bloody glory of the battle field) of their own, without crediting to them the works of others. E. M. RICHARDS.

Lebanon, Pa., June, 1857.

MESSRS. EDITORS—I perceive from a paragraph in your last issue on the subject of the tubular bridge over the Menai Straits, that you claim the merit of that magnificent invention of modern genius for William Fairbairn. Allow one of your constant readers and admirers (who finds your journal one of the most attractive features in our public library, over which I have the honor to preside,) to say that your judgment on that point does not coincide with that of the author of an elaborate article in the London Quarterly Review, nor with that of Jas. D. Fownes, D.C.L., F.R.S., Sec. R. S., and author of the Sixth Dissertation prefixed to the eighth edition of the Encyclopedia Britannica, on the progress of the mathematical and physical sciences. In this Dissertation (which has accompanied the twelfth volume of the Encyclopedia Britannica) page 877 of Dissertation, you will find as follows:—

"To Mr. R. Stephenson is clearly due the credit of undertaking, on his sole responsibility, a project of equal boldness and novelty, and of contriving, not perhaps in every detail, but in its totality, the means by which so signal a triumph of art and science was carried into effect, an honor to his own age and a lesson to posterity."

The remainder of the paragraph, while acknowledging the signal merit of Messrs. Fairbairn and Hodgkinson, as assistants, still claim the responsibility and the honor of the plan, as a whole, for Robert Stephenson. I am aware of the labored attempt of Dr. Brewster, or some other able writer, in the North British Review, to detract from the high merit of Mr. Stephenson; but I must confess, after a candid perusal of both articles, and careful reflection, that I still regard Robert Stephenson as entitled to the immortal honor of conceiving and developing the first grand idea of that magnificent work of art and genius, although greatly dependent on the amazing practical skill and constant aid of Messrs. Fairbairn and Hodgkinson.

Hundreds and thousands of practical men will take their opinions from you, and it behoves you to deal out fair and exact justice between man and man.

You will excuse this note, as your opinion has excited a little controversy among your readers in our rooms. Will you please let us know the grounds of your opinion, and if hastily formed, perhaps you may see reason to change or modify it. F. J. JUDSON.

Library Rooms, Bridgeport, Ct., June 16th.

[As early as 1802, Mr. Rennie proposed to construct a fixed cast iron bridge over the Menai Straits of one single span 450 feet, and 100 feet above the water. His plan was not adopted—that of Telford (a suspension bridge) was substituted. Forty years afterwards, when the Chester and Holyhead railway had to be carried over the Straits, Mr. Robert Stephenson—who was chief engineer—acting on Mr. Rennie's idea, proposed to build a cast iron arched bridge of two spans, each 450 feet, 100 feet from the level of the water to the crown of the arch, and 50 feet from the spring of the arch to the water. The Commissioners of the Admirality refused to permit the erection of this bridge—they required a clear water way of 100 feet. Mr. Stephenson then abandoned his first plan, and proposed a hollow girder or tube of wrought iron, and suggested the elliptical form as the best; but he did not go on and carry out the idea. Not relying upon his own knowledge in such matters he wisely determined to call Mr. Fairbairn to his assistance. Why did he select him? He might have gone on unassisted and completed the Britannia tubular bridge; and the reasonable conclusion is that he would have done so if his plans had been perfected. Mr. Fairbairn was selected, because he was the inventor of the wrought iron hollow girder, which he had applied in constructing floors as early as 1832, and because he was better acquainted with the strength and combinations of wrought iron plates for building purposes than any man in England. Mr. Fairbairn's experiments, which were conducted at the request of Mr. Stephenson, resulted in the discovery of that form of the tubular bridge adopted—not that first suggested by Robert Stephenson—and he secured a patent for his method of constructing hollow wrought iron girders October 8, 1846, eight months before the first tube for the Britannia bridge was commenced—which was in June, 1847—and since that bridge was put up he has constructed several railroad bridges on his hollow girder principle.

In what we have said now and in the note which called forth the above letters, we have not used a single word that could be construed into a disparaging remark towards Robert Stephenson. Our language in the article referred to was, "William Fairbairn, C. E., discovered the best form of bridge, and he certainly is the inventor of it, as it is now constructed." Our correspondents have not adduced a single fact to prove the incorrectness of our statement, which does no discredit to Mr. Stephenson, nor ruffles his well earned laurels as the chief engineer of the Menai Tubular Bridge.—ED.

Inventor of the Mexican Barometer.

MESSRS. EDITORS—By referring to Thomas Jefferson's letter to Mr. Vaughan, dated at Paris, December 29, 1786, a very full description will be found of an instrument that has been going the rounds of the newspapers a few weeks past as a Mexican barometer of recent invention. It is spoken of in the letter as a hygrometer invented by Mr. Rittenhouse. C. H.

Detroit, Mich, June, 1857.

[We are glad that our correspondent has directed our attention to this circumstance in connection with the name of David Rittenhouse, who was one of the most skillful and ingenious mechanics and philosophers our country has produced. He was born at Germantown, Pa., 1732. He taught himself geometry and discovered fluxions before he was aware that this had been accomplished by the great Newton. He united operative skill with high scientific qualifications, made chronometers, telescopes, and mathematical instruments, and was the first American astronomer in his day. He constructed a planetarium in 1770, which raised his reputation as a mechanic, mathematician, and astronomer to the highest grade. In 1795 he was elected a fellow of the Royal Society of London; and his life is an example worthy of being copied by every young American mechanic.

Treating Wood for Violins.

MESSRS. EDITORS—I saw in the SCIENTIFIC AMERICAN a few weeks since an article on violins. I made one about six years ago with a curled maple back and hemlock top. The wood was very well seasoned, but I also put it in a steam box placed on the exhaust of an engine, and left it for about eight hours. In about three weeks after this treatment of the wood I commenced to make the violin, and before gluing the pieces together, I made some very weak glue water, and washed their inner surfaces. It is considered to be the sweetest toned violin in this place by those who have played on it. I think wood becomes more solid by being steamed. This is the reason why my violin has such an excellent tone. H. STRAUCH.

Pottsville, Pa., June, 1857.

Comparative Speed of Horses and Oxen.

A bet was made recently between two farmers in France about the speed of horses and oxen with a heavy load the same distance—about twelve miles. A four horse team was put to a wagon loaded with 10,000 pounds of beet root pulp. The oxen were two or a double yoke, with the same amount of load. The horses beat them only seven minutes. Time, 3 hours 6 minutes; 3 hours 13 minutes.

W. A. B., of Cal.—The specimen of rock which you have sent us is white flint.

W. M. B., of Ct.—The best engineering school in New England is Yale College. Endeavor to obtain a situation in some able civil engineer's office, so as to acquire practical knowledge.

T. H., of N. Y.—We really cannot make out your sketch nor what you mean to accomplish, or expect to gain, by such a complication of cranks, rods and lazy-tongs levers.

G. W. F., of Mo.—Have you ever tried a mixture of soap stone dust with black lead in making your crucibles? We have been informed that it improves their qualities with regard to durability.

C. H. of N. Y.—Various patents have been secured for recovering vulcanized india rubber. See page 339, Vol. 11, Sci Am., for description of one process.

J. R. M., of N. S.—We cannot give you the name of any manufacturer of tools for all the operations of boring Artesian and deep wells.

H. M., of N. Y.—Your plan of curry comb is novel to us, and we think, without doubt, patentable. Send down your model and the first fee, ($30,) and we will advise further.

C. C. S., of Ct.—A model constructed of soft wood, if neatly made and stained, will answer for an application for a patent. The initials of your given name are sufficient for the plate.

D. H H., of N. Y.—The mill to which you refer is capable of performing well, but it will not justify the statements made in its favor by Prof. Mapes. For some reason unknown to us the inventor has never made them for market.

N. S. B., of Va.—The sewing machines of Singer, Wilson and Grover are all good for family use. We believe the prices are about the same for each.

A. R. E., of Pa.—We do not advise you to apply for a patent on your alleged substitute for the crank. It cannot be made to operate with success except upon a very small class of engines. There are other devices equally capable of doing all you can accomplish by yours.

J. K. P., of N. H.—On the 15th of January, 1856, Lewis White, of Hartford, Ct., took a patent in a curtain fixture which agrees with your description. The fastening of a printed bill, with the name of the patentee and date of the patent, on a package of so small an article as these you mention, would, in our opinion, meet the requirements of the law.

S. A. Marsteller, of Allentown, Pa., writes to procure a machine for washing sand. Will some of our readers furnish him with the information?

T. H M., of Ga.—We do not undertake agencies such as you solicit. The party you name, we believe, is not in this city. He was at Chicago when we last heard of him.

C. T. H., Jr., of S. C.—Prof. Gillespie's two works, one on "surveying," and the other on "road-making," are the best we can recommend to you. Published by Appleton & Co., this city.

W. H. S., of N. Y.—The book to which you refer is of little use for your purpose.

J. G of Ill.—A good treatise on lightning conductors is published by G. P. Putnam & Co., this city. It will give you the necessary information.

G. B. of N. J.—Have you ever applied your locomotive to plowing? It appears from your description to be a good invention for the purpose. You should bring it before the public.

S. D. McD., of N. Y.—The idea of igniting gas by electricity, we are aware, is quite old We have done it years ago ourselves with a spark from the knuckle.

J. B. T., of Pa.—There is no work which contains rules for calculating the power of coiled springs. Their tension depends upon the quality of the steel of which they are made. Two coiled springs of different qualities of steel will exhibit a difference in their tension, although of the same form and size.

C. H., of ———. We did not receive the telegraphic despatch to which you allude. If you could prove that arsenic vapors were generated in the National Hotel, Washington, then you could make a strong point in favor of your theory of the disease.

E. M. L., of Boston.—No person can give you proper advice regarding the disease of your eyes without examining them.

G R., of Iowa.—D'Aubuisson's work on Hydraulics contains the theory of the turbine wheel; also, J. B. Francis, Esq., of Lowell, has given a full description in his geat work describing experiments. You will also find large and fine drawings of a seven hundred horse power turbine in the third edition of "Tredgold on the Steam Engine."

C. D. W. B., of O.—Smooth rollers are generally employed for pressing sugar cane. There are three rollers in a set—one on the top between two underneath. This is the best method you can employ for pressing the Chinese cane.

J. A. L., of Mich.—We have published all that is necessary on the "divining rod" for the present. Although some evidence has been given that electricity plays a part in the operation, that evidence has one contradictory feature. When all the phenomena harmonize with the laws of electricity our scepticism may be removed.

H. D. B., of Mass.—We would recommend you to send your articles to I. S. Clough, 166 Broadway, this city, who sells all kinds of "Yankee notions" and domestic articles on commission. He is well calculated to find customers for such goods, and, moreover, is financially responsible. He also purchases patents on all kinds of housekeeping articles.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, June 20, 1857 :—

J. D. H., of Ill., $25; L. & B., of S. C., $25; J. C. T., of Ill., $25; T. E C. B., of Ky., $10; A. D. of N. C., $33 G. & W., of O., $55; W. R., of N. Y., $30; M. C. B., of O., $30; A. R. K., of N. Y., $28; I. M., of N. Y., $30; J. R. P., of N. Y., $250; L. & M., of Conn., $30; L. & B., of Mass., $14, C. K., Jr., of N. Y., $30; C. F. B., of ——, $38; L. C. S., of Conn., $30; T. & G., of N. Y., $25; A. F. A., of Conn., $25; S. L. W., of Pa., $25; J. T., of N. Y., $30. M. & E., of N. Y., $30; J. J. O., of Miss., $25; J. F. & E. W., of N. Y., $30; W. W. B., of N. Y., $30; D. C. T., of Wis., $20; H. H., of N. Y., $25; H. G., of L. I., $25; J. K., of N. J., $25; W. M., of La., $25; J. & S., of N. Y., $25; C. W., of N. H., $35.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, June 20, 1857:

L. & T., of France; H. H, of N. Y.; L. & B., of S. C.; J. C. T., of Ill.; J. D. H., of Ill., H. G., of L. I.; S. L. W., of Pa.; T. & G., of N. Y.; J. J. O., of Miss.; A. B. K., of N. Y.; A. F. A., of Ct.; L. & B., of Mass.; J. K., of N. J., W. M., of La.; J. & S., of N. Y.; C. W., of N. H.

Important Items.

☞ Complete Sets of Volume XII Exhausted.—We regret that we are no longer able to furnish complete sets of the present volume. All the back numbers previous to No. 27 are entirely exhausted.

Give Intelligible Directions.—We often receive letters with money enclosed, requesting the paper sent for the amount of the enclosure but no name of State given, and often with the name of the post office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the post office at which they wish to receive their paper, and the State in which the post office is located.

Subscribers to the Scientific American who fail to get their papers regularly will oblige the publishers by stating their complaints in writing. Those who may have missed certain numbers can usually have them supplied by addressing a note to the office of publication.

Terms of Advertising.

Twenty-five cents a line each insertion. We respectfully request that our patrons will make their advertisements as short as possible. Engravings cannot be admitted into the advertising columns.

☞ All advertisements must be paid for before inserting.

Science and Art.

Boucherie's System of Preserving Wood.

This is a subject of great and growing importance, especially as our vast forests are disappearing so rapidly before the great demands made upon them for railway engineering, shipbuilding, and all the other arts in which timber is largely employed. Wood is peculiar in its character; it possesses the quality of being easily worked into any form by cutting tools, and is so light, elastic, strong and fibrous that we never can dispense with its use for a great many purposes. But although it is so well adapted to many objects in engineering, nautical and civil architecture, it inherits the defect common to all organic productions, of liability to early decay by slow combustion when exposed to the influence of the weather—heat, air, and moisture. Some large and valuable ships have been rendered unseaworthy by dry rot, in a very short period after they were set afloat; the sleepers of railways have to be renewed about every seven years; plank roads in four years; and the strongest and best timber bridges have but a short term of existence.

Some substances, such as paint and pitch, have been employed from time immemorial to preserve timber by protecting the surface, mechanically, from air and moisture; but as decay or rot in wood is a chemical change, the best agents for preserving it appear to us to be those of a chemical nature. It is to this principle of wood preservation that the minds of men of science have been mainly directed of late years, and with very gratifying results in a number of cases.

The common method employed in treating wood chemically is to place it in an iron cylinder, exhaust all the air from its pores, and then force in an antiseptic agent under pressure. The Kyanizing and Burnettizing processes derive their names from two inventors, who have used different chemical agents in treating timber. The former employed corrosive sublimate; the latter chloride of zinc, as described on page 93, this Vol., Scientific American. Another process has also been alluded to in our columns, namely, that of Dr. Boucherie, of France, an illustration of which we are gratified to find in a late number of *La Science Pour Tous*, published in Paris, from which we have made the accompanying free copy of the figure, and free translation of the description.

The nature of this process consists in impregnating the timber, in logs, by the pressure of a column of the antiseptic liquor, which is made to force itself into all the pores of the timber with no other apparatus than an elevated tank, a pipe, and a hood for the log, and which, if it operates as effectually as is stated by our Paris cotemporary, can be economically conducted in the midst of our forests.

A represents a hogshead containing sulphate of copper placed upon the top of the butt of a cut tree, B. The liquor in A was intended to percolate, as it were, through the pores of the wood, to displace the sap. It was an ineffectual and clumsy arrangement. The next method, and that which is now practiced in France, is represetned by the tanks, C L, on the top of stages, D D. From tank C, containing a solution of sulphate of copper, a pipe leads to a cut log on the ground, on the butt end of which there is a wooden disk, having an opening to receive the pipe, E; a spike, *f*, fastens it firmly to the log, leaving a small space between them, which is filled around the outside with hemp packing saturated with tallow. The liquor is now admitted by opening a cock placed on the foot of the pipe, and the pressure of the column forces the solution through the log, driving the sap before it; and when it (the solution) appears coming out at the other end of the log the operation is completed.

The log 2 has a deep notch cut in the middle, and is supported at three points; two blocks at the ends are afterwards removed, as shown by log 5, and the notch allowed to spread open. This space is now packed round with hemp *gasket*, and the two ends then raised, as shown by fig. 1, where pipe M, from tank L, enters the log at N, and the liquor is then allowed to force itself from the middle to the ends of the log without the use of a shield like F.

These are the two methods representing Dr. Boucherie's process in *La Science Pour Tous*. A more convenient plan would be the use of a permanent elastic hood, I, of india rubber, connected with pipe H of tank G, and secured to log 3 by a clamp, K. This hood can be employed for various sizes of logs, and be taken off and put on with facility.

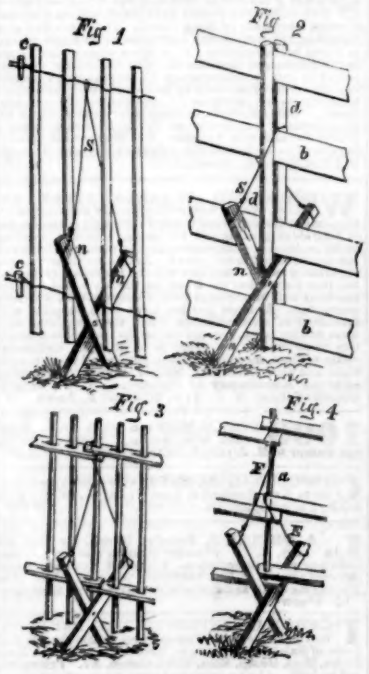
It is stated that it takes from twenty-four hours to three days, according to the size of the logs, thus to impregnate them with the antiseptic liquor.

The solution employed by Dr. Boucherie is very weak, being formed of only about one pound of the sulphate of copper to one hundred gallons of water. As it displaces a great quantity of the sap, which is the real cause of fermentation and decay in the wood, a weak solution is held to be the best. Timber thus treated, it is stated, becomes harder and closer in the grain, and endures three times longer than the same kind not submitted to a like process.

THE PRESERVATION OF TIMBER.

Reyman's Field Fence.

The fence here illustrated in intended to dispense with posts, and, consequently, with the labor of setting the same, and provides as a substitute two stakes forming an X or cross, with their upper ends connected to each other and to the upper part of the fence, by a wire, or small metallic rod—the stakes and wire being so arranged that the act of driving the stakes into the ground secures together two adjacent panels of fence, and at the same time binds them firmly in the proper position and to the support, while the support itself is also completed by the operation. The construction was secured by patent on the 28th of March, 1856.



The following description, in the language of the inventor, not only very clearly sets forth the peculiarities of this novel system, but details some points of importance in the erection of wire and other fences generally.

Fig. 1 shows its application to a wire and picket fence, that is, a fence wherein the pickets are enclosed and secured by an iron rail, made by two or more wires twisted together.

In making this fence a well braced post—which it is preferable should be iron—is set at each end to secure the wires when strained between them. The small hand levers, *e e*, are used to twist the wires together as each picket is put in, and are revolved alternately in opposite directions, as occasion may require, to untwist the front part of the wires. As the fence progresses, a set of the stakes, *n n*, fastened by the guy wire S, are placed at intervals of 10 or 12 feet. These stakes should be about 4 feet long and 1 1-2 by 3 inches, and are placed at an angle of elevation of about 60°, and driven into the ground 12 or 14 inches. They are first driven but a few inches, when the wire, S, is fastened on, and they are then driven hard, thereby tightening the wire, S, and binding the fence firmly in the crotch. Sometimes the stakes are nailed together at their crossing, but this is generally found unnecessary in practice. These stakes are cheaply and easily replaced by new ones when rotted off; still it is well to soak them in a solution of blue vitriol in water, or dip them in hot coal tar as a preservative, before driving them in the ground.

For the purpose of holding and stretching the wires in making long pieces of fence, each double wire is passed through additional stakes, and pins are driven by their sides, to prevent them slipping easily. These stakes are driven into the ground at convenient distances, on the line of the fence. A prop of any convenient form holds the wires the proper distance apart, and from the ground. The pins by the side of the wires are kept just tight enough to let them slip gradually as they become too much strained when being twisted together.

The elasticity of the wood counteracts the effects of heat and cold on the wires; in fact, this fence is always the tightest in warm wet weather—a result caused by the swelling of the pickets, as has been found by actual experience.

Fig. 2 shows the application of this invention to a board fence. The boards being made into panels, they are lapped so as to bring the battens, *d*, opposite, enclosing the boards between them. The stakes cross each other with the battens between them. The upper part of the panels are bound together by the guy wire, S, passing once round the battens. Driving the stakes in this, as well as every other case, tightens the wire and binds every part together, and the battens are nailed to the stakes at each crossing. This fence is actually more solid than a common post and board fence, is much cheaper to put up, as there are no holes to dig or posts to set, and is very convenient to move from place to place.

Fig. 3 shows its application to what is known as a "ladder fence," the panels being simply lapped and connected together by a shouldered picket passing through all the rails. The end of the uppermost of the lower rails is, however, simply notched, and rests astride of the connecting picket. This allows the panels to be readily put together or taken apart, and also to be raised and lowered in fencing uneven ground. The guy wires encircle the upper rails, and the panels are in every respect firmly supported and bound together.

Fig. 4 shows its application to a "three rail fence," used only for fencing against large stock. To make this fence, the stakes are first driven a few inches, and the lower ends laid lapping in the crotch thus formed. A hole is next bored through the upper rail directly above the crossing of the stakes, in which is placed the standard, A, with two short wires fastened to it—one, E, near the middle, in a groove made for the purpose, and the other, F, on the upper tapering end. The second rails are fastened by being secured between the lower guy wire, E, and the standard, *a*, the groove preventing the weight of the rails from forcing the wire downwards. The upper rails are fastened in a similar manner, being looped in between the wire, F, and standard. Driving the stakes causes the wires to cut into the rails, and holds them very firmly.

For further information address the inventor, J. B. Reyman, Bloomington, Ill.